BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

In The Matter Of PUBLIC UTILITIES COMMISSION. Instituting a Proceeding to Investigate the Implementation of Feed-in Tariffs	DOCKET NO. 2008-0273

OPENING BRIEF OF THE HECO COMPANIES AND CONSUMER ADVOCATE

AND CERTIFICATE OF SERVICE

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Pursuant to the Commission's April 27, 2009 Order[1] in the above-captioned proceeding, Hawaiian Electric Company, Inc. ("HECO") and its subsidiaries Maui Electric Company, Limited ("MECO") and Hawaii Electric Light Company, Inc. ("HELCO") (collectively, the "HECO Companies") and the Division of Consumer Advocacy, Department of Commerce and Consumer Affairs ("Consumer Advocate"), herein respectfully submit their Opening Brief in the above-captioned proceeding.

INTRODUCTION

Through its Order Establishing Hearing Procedures ("Hearing Order")[2], the Commission identified eight major issues to be addressed and forty separate decisions that need to be made in establishing a feed-in tariff ("FIT") for Hawaii. The issues to be addressed and decisions to be rendered in this docket are presented not in a vacuum, but in the context of the State's energy

[1] Order Granting The County Of Hawaii's Motion For Approval To Amend Its Status As An Intervenor To A Participant, Filed On April 8, 2009; Granting The City And County Of Honolulu's Motion For Approval To Amend Its Status As An Intervenor To A Participant, Filed On April 8, 2009; Amending Hawaii Holdings, LLC, Doing Business As First Wind Hawaii And Sempra Generation's Status As Intervenors To Participants; And Amending The Schedule In This Proceeding. This Order was modified by the Commission's May 21, 2009 letter granting a request by DBEDT to extend the deadline for the filing of Opening Briefs by three weeks until June 12, 2009.

[2] Order Establishing Hearing Procedures issued April 1, 2009.

infrastructure and policy both as they exist today and as they are envisioned to change in the future. These issues and decisions exist in many respects not because Hawaii has been reluctant to embrace renewable energy; rather, they exist because of the considerable investment in renewable resources that has already been made and the significant commitment to a renewable energy future that is ongoing. They exist not because the State is being timid, but because it is being bold.

At a time of momentous change there is a spectrum of decision making. On one end of the spectrum is a course where the perfect can be the enemy of the good; where the desire to understand and evaluate every possible impact results in stalemate and inaction. On the other end is a course which views a goal as something to be achieved at any cost, a course which regardless of clarity seeks to move forward unfettered by the constraint of consequence.

There is also a middle ground. When confronted with uncertainty, this course seeks to balance the need for progress with consideration of the need to understand the road ahead. Rather than remain at the starting line or rush headlong into an unforeseen void, this course takes firm steps toward a goal with full recognition that adjustments will need to be made along the way as more and better information is secured. This is the course that the HECO Companies and Consumer Advocate have taken with their jointly proposed FIT ("Proposed FIT").

The Proposed FIT is <u>not</u> designed to be all things to all parties. It is designed to fill a particular role and to do what a FIT does best, allow for the streamlined procurement of renewable resources through an efficient and standardized process. The Proposed FIT appropriately balances incentives to build with the need to maintain system security, power quality and avoid adverse ratepayer impacts. As envisioned, the Proposed FIT would allow a qualifying renewable resource developer to review the utility's published rate and standardized

agreement and if acceptable to the developer, to sign up with minimal interaction with the utility. To the extent that the Proposed FIT contains any limits, the limits exist to ensure that the Proposed FIT fulfills its unique role among the HECO Companies' various procurement initiatives.

The Proposed FIT complements a host of other renewable resource procurement programs in existence and to be developed by the HECO Companies to facilitate movement toward a renewable energy future for the State. Accordingly, where a particular resource has not been demonstrated to have commercial application in the State, would require more extensive interaction with the utility such as through negotiations regarding interconnection of the facility, or where the design of a project is larger and more complex, these resources have been reserved to other better suited procurement programs such as the Commission's Competitive Bidding Framework or bilateral negotiations with the utility.

Consequently, the Proposed FIT initially focuses on resource types with which the utilities have at least some commercial experience at sizes which the utilities believe can, in the majority of cases, be integrated without significant impacts on system security or power quality, without unreasonable impacts on the utility ratepayer, and without a need for protracted negotiations with the utility. With the benefit of time and experience, not just with the Proposed FIT but with all of the HECO Companies' renewable resource procurement mechanisms, the Proposed FIT may be updated at regular intervals (the first being within two years of the initial FIT) to integrate additional technologies and sizes of projects as is appropriate in the circumstances.

The HECO Companies and Consumer Advocate respectfully submit that the Proposed FIT is the only proposal which is supported by the record, which appropriately considers all of

the variables for determination by the Commission in context, and which provides a going forward solution which is both innovative and responsible.

SUMMARY OF GENERAL PRINCIPLES

The following sections of this Opening Brief respond comprehensively to the questions posed and decisions identified in the Commission's Hearing Order. At its foundation however, the purpose of this briefing is to allow the Commission to set forth the key principles which will guide the parties as they move forward to develop a proposed tariff for the Commission's consideration. The HECO Companies and Consumer Advocate respectfully offer that a detailed examination of the evidence presented to date in this proceeding leads naturally to the following conclusions and general principles which should guide the development of an initial FIT for Hawaii.

1. While it is an important overall goal, a Hawaii FIT should not focus only on maximizing system penetration of new renewable energy resources. A Hawaii FIT must equally consider the need to maintain system security and reliability, power quality and mitigate undesirable financial impacts to ratepayers. This is supported by the discussion in Sections II, and II.A.
2. A Hawaii FIT should complement and integrate with all of the HECO Companies' other renewable energy procurement programs approved by the Commission, both existing and new, and recognize that a FIT is just one resource in a portfolio of renewable energy procurement mechanisms in the State. This is supported by the discussion in Sections I, I.A, I.B, I.C., I.D., I.E and I.F.
3. To facilitate the rapid adoption of a Hawaii FIT, there should be an initial FIT which will be followed by regular updates. The first FIT update should occur within 2 years of the

Commission's approval of the initial FIT to allow sufficient time for studies to be performed and experience to be gained. This is supported by the discussion in Sections V.D., and V.E.

4. The initial FIT should focus on the four technologies with which the HECO Companies have some commercial experience and which can more efficiently be accommodated through a FIT program: photovoltaic ("PV"), concentrated solar power ("CSP"), small wind, and in-line hydro facilities. Other technologies, which may include but may not be limited to wave energy, landfill gas, sewage-based digester gas, and biomass, should be evaluated through the FIT update process. This is supported by the discussion in Section III.A.

5. The initial FIT should focus on the size of projects set forth in the Joint Proposal of the HECO Companies and Consumer Advocate as this size of project will allow for a diversity of resources and suppliers, while at the same time being mindful of the need to maintain system security and power quality particularly on the neighbor islands. Increases in project sizes may be evaluated in each FIT update which will allow for decisions to be based upon information gathered through ongoing studies as well as the CESP process. This is supported by the discussion in Sections II, II.A, and III.B.

6. Any decision to expand on the HECO Companies' and Consumer Advocate's Joint Proposal to include project sizes up to the minimum capacity sizes eligible for the Competitive Bidding Framework should apply only to Oahu and must be accompanied by appropriate interconnection rules and procedures to assure system reliability and security. Any such expansion must also ensure that the rates paid to project developers, as with smaller projects eligible for a FIT, are just and reasonable. The most appropriate

proceeding to fully evaluate the impacts and costs of expansion of the FIT program is the first FIT update. This is supported by the discussion in Sections II, and II.A.

7. The initial FIT should include annual limits on the total amount of new renewable energy capacity that each island system may accept via the FIT, recognizing that: (1) the ability of neighbor island systems already constrained by existing and to be installed variable resources may be limited; (2) all of these resources may impact each others' operation and economics; and (3) that these new projects, both individually and collectively, have the ability to impact both existing projects as well as projects from procurement processes already underway. This is supported by the discussion in Sections II, and II.A.

8. FIT pricing should be based on the costs to develop, operate, and maintain a typical project. This will serve both to incent more than just the most cost effective projects while at the same time preventing ratepayers from having to subsidize uneconomic or poorly located projects. This is supported by the discussion in Section IV.A.

9. Proposals for the appropriate return on equity that should apply to FIT rates must demonstrate that the return proposed is just and reasonable and supported by documentation indicating that the data provided in support of the proposed rate is accurate, reliable and relevant to the Hawaii market. This is supported by the discussion in Section IV.B.

10. FIT rates should be based upon Hawaii project-specific cost information to the extent possible. To the extent that Hawaii specific information is not available, secondary data sources may be used to the extent that data is appropriately adjusted so as to be relevant for Hawaii price development. This is supported by the discussion in Section IV.C.

11. The HECO Companies' and Consumer Advocate's proposal to use a Discounted Cash Flow (DCF) analysis methodology to assess cost of generation and the return on investment (ROI) and Internal Rate of Return (IRR) for the project over the life of the system is reasonable. This is supported by the discussion in Section IV.D.

12. It is appropriate to allow the HECO Companies to impose operational standards and requirements, including generation curtailment, in order to maintain system reliability and meet obligations to existing power purchase contracts. It is also reasonable that generators that do not have the ability or willingness to curtail output upon the utility's request should receive a lower FIT rate and also be subject to lower annual capacity targets. This is supported by the discussion in Sections II, II.A, IV.E, and IV.F.

13. Investment and production tax credits should be considered as positive cash flows to the developer when conducting a discounted cash flow analysis to determine the FIT energy payment rate. This is supported by the discussion in Section IV.G.

14. Rebates or other financial benefits received by the project should be considered as positive cash flows to the developer when conducting a discounted cash flow analysis to determine the FIT energy payment rate. This is supported by the discussion in Sections IV.H., IV.I, and IV.J.

15. Generally, once an appropriately designed FIT rate is in place and the resource is operating and delivering power at that rate and pursuant to its FIT Agreement, that rate should not be subject to adjustment mid-course. This is supported by the discussion in Section IV.K.

16. The standard term for a Schedule FIT Agreement should be 20 years for all eligible renewable resources. This is supported by the discussion in Section V.A.

17. The appropriate vehicle to document the terms, conditions and obligations between the developer of the renewable resource and the utility is a standard offer contract. This is supported by the discussion in Section V.B.

18. Following the initial term, projects should be allowed to extend their contracts on a year-by-year basis subject to a revised FIT energy rate appropriate for the specific project circumstance. This is supported by the discussion in Section V.C.

19. A FIT Update should be conducted for all islands in the HECO Companies' service territory and completed not later than two years after initial implementation of the FIT. Thereafter, the FIT Update should be conducted every three years, incorporating inputs from the Clean Energy Scenario Planning ("CESP") process. This is supported by the discussion in Sections V.D. and V.E.

20. Any environmental credits associated with renewable energy purchased by the utility from the developer should be the property of the utility, provided, however, that such environmental credits should be to the benefit of the utility's ratepayers in that the value should be credited "above the line." This is supported by the discussion in Section V.G.

21. It is reasonable for the Commission to expressly reserve its right to suspend the FIT program based upon system reliability concerns or concerns regarding significant ratepayer impacts. This is supported by the discussion in Sections II, II.A, and V.H.

22. Consistent with the HCEI Agreement, any FIT program must insure that the electric utility implementing the program remains financially sound. This is supported by the discussion in Sections VI.A., and VI.B.

23. FIT costs should be allocated to customers of the three HECO Companies on a utility by utility basis. This is supported by the discussion in Section VI.B.

24. The queuing and interconnection procedures set forth in the HECO Companies' and Consumer Advocate's joint proposal are reasonable. These procedures may be revisited as a part of the first FIT update. This is supported by the discussion in Section VII.A.

DISCUSSION

Through its Hearing Order, the Commission replaced the issues set forth in the Commission's January 20, 2009 Order Approving The HECO Companies' Proposed Procedural Order, As Modified, with the issues set forth in the Hearing Order. (Hearing Order at Ordering Paragraph 1) The Commission also identified certain decisions which the Commission must make upon conclusion of the panel hearings convened from April 13, 2009 to April 17, 2009. (See, Exhibit A to the Hearing Order) Accordingly, in an effort to aid the Commission in its deliberations, this Opening Brief is structured to provide responses to the questions identified in Exhibit A to the Hearing Order based upon the record in this proceeding to date.[3]

I. Given the four existing renewable producer options (Schedule Q, net metering, competitive bid, and non-bid PPAs), what contribution would FiTs make toward achieving Hawaii's renewable energy goals?

While each of the four existing renewable producer options plays a vital part in the HECO Companies' efforts to achieve the State's renewable energy goals, the Proposed FIT would provide an additional and complementary option to both existing renewable resource procurement programs as well as those to be developed and coordinated in the future. Specifically, FITs provide a mechanism to stimulate renewable energy development by providing predictability and certainty with respect to the future prices to be paid for renewable energy and

[3] During the panel hearings in this proceeding, the Commission identified and the parties discussed certain legal questions to be addressed in post hearing briefing. These questions were later distributed by the Commission as a courtesy on May 8, 2009. The HECO Companies' and Consumer Advocate's responses to these legal questions are respectfully submitted in a separate filing to this Opening Brief.

the terms and conditions pursuant to which the renewable energy will be provided. Additionally, by also setting rates at the cost of technology (plus profit), the Proposed FIT will delink costs paid to generators from avoided cost, which is also a goal of the HCEI Agreement.

A. Should the Commission state a quantitative goal for renewables purchases in Hawaii generally and for FiTs specifically?

Quantitative goals for renewable energy purchases in Hawaii are set forth in the State's Renewable Portfolio Standard ("RPS"). The current version of the RPS calls for each electric utility company to procure 20 percent of its net electricity sales from renewable electrical energy by 2020, with interim stepping stones of 10 percent by 2010 and 15 percent by 2015. In meeting these goals, utilities may count existing renewable generating facilities and energy efficiency and energy displacement technologies towards the targets. In addition, the HECO Companies may aggregate their renewable portfolios to achieve the overall target. (HECO Feed-In Tariff Program Plan prepared by KEMA and submitted to the Commission on December 23, 2008 ("KEMA Report") at 2-3)

In 2007, the HECO Companies procured 16.1 percent of their electricity portfolio from eligible RPS resources, an increase from the 13.8 percent achieved in 2006. This increase was achieved through demand side management programs and the addition of three new wind farms. Although the HECO Companies have made progress towards the RPS goals, the HCEI Agreement proposes changes to the RPS framework that will require significant additions to the amount of renewable capacity installed within the state. These changes include an increase in the RPS target to 40 percent by 2030, a requirement that energy efficiency and renewable displacement technologies no longer be eligible for RPS compliance after 2014, and that through 2015 no more than 30% of the HECO Companies' RPS may come from imported biofuels

consumed in utility-owned units. (Id.) The Proposed FIT will be an important element in achieving the State's renewable energy targets.

In light of the fact that quantitative goals for the procurement of renewable energy have already been established by the Hawaii Legislature, and the fact that the HECO Companies are in full compliance with that existing standard, the Commission should retain flexibility in setting additional goals for renewable energy purchases in the State. This would allow the Commission to pursue the ideal mix of resource procurement options that allows the State to receive maximum system and ratepayer benefits as the State works to achieve its evolving renewable energy goals.

B. Are there gaps or suboptimalities in present programs that make FiTs necessary to achieve Hawaii's goals?

The HECO Companies' existing renewable resource procurement programs provide vehicles to solicit and secure all types and sizes of renewable energy projects. However, as identified in the HCEI Agreement, there are a number of new and more targeted programs that the HECO Companies have committed to develop, including the Proposed FIT, that will facilitate the acquisition of more renewable energy in a more efficient and streamlined manner. This is anticipated to bring on a more diverse base of distributed resources in a shorter period of time while also ensuring that resources under the Proposed FIT are reasonable in cost and do not negatively impact the reliability of or unduly encumber the operation or maintenance of the State's unique island electric systems.

C. Net Metering: Should net metering be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should Net Energy Metering apply to and what renewables should FiT apply to?

Through the HCEI Agreement, the HECO Companies and the Consumer Advocate proposed that no applications for new net energy metering contracts should be accepted once the FIT is formally made available to customers. All net energy metering systems under contract, or contracts in the process of utility review at the time the FIT is formally made available to customers, would be grandfathered. Such grandfathering would apply for the life of the net energy metered system, meaning changes in ownership of net energy metered systems would be allowed. Expansion of net energy metering system capacity would not be allowed once the FIT is established. Net energy metering customers may opt-in to the FIT at any time, provided that the remaining useful life of the system is at least as much as an available FIT term. (KEMA Report at 4-3)

Based upon discussions during the course of this proceeding, the HECO Companies and Consumer Advocate propose that the NEM program, as described in Section 19 of the HCEI Agreement, should continue to be offered until the first FIT Update discussed herein is completed, two years after FIT implementation.[4]

D. Schedule Q: Should Schedule Q be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should Schedule Q apply to and what renewables should FiT apply to?

Once a FIT is available, no new applications for Schedule Q contracts should be accepted. Existing Schedule Q generators would have the option of opting in to the Proposed FIT or staying under their existing contractual arrangements through the term of their agreement. If a Schedule Q generator opts into the Proposed FIT, they must stay under the FIT—they cannot return to being a Schedule Q generator. Additionally, existing Schedule Q generators should be

[4] The HCEI Agreement envisioned that the NEM program would be replaced by the Proposed FIT. To the extent that a decision is made to continue the NEM program after the first FIT Update, either in full or in part, the

aware that the rate they will receive under the FIT may be discounted from the rate offered to attract a new renewable resource, given that an existing generator will have different costs compared to a new resource. Also, should the Schedule Q customer add a new eligible renewable energy system, then that system is only eligible for the FIT. Expansion of Schedule Q system capacity will not be allowed once an applicable FIT becomes available. Schedule Q generators could also continue under their existing arrangements if there is a change in system ownership, although the utility may require the owner to execute a new Schedule Q agreement. To the extent that a FIT option is not available for projects under 100 kW, Schedule Q would remain an option for those resources which qualify. (KEMA Report at 4-3)

As is discussed in more detail below, because the Proposed FIT will effectively replace Schedule Q in some instances as a vehicle for compliance with the Public Utility Regulatory Policies Act of 1978 ("PURPA"), the HECO Companies and the Consumer Advocate respectfully request the Commission's determination as part of any approval of the Proposed FIT, that the offering of a FIT option for qualifying Schedule Q resources is consistent with the HECO Companies' obligations under PURPA.

E. Negotiated power purchase agreements: Should present practices be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should present practices apply to and what renewables should FiT apply to?

The HECO Companies and Consumer Advocate propose that bilateral negotiations between the utilities and any renewable resource developer continue to be an option, in particular to address those projects or situations which may not be easily addressed through the utilities' other procurement programs and options. However, given that the Proposed FIT is designed to

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HECO Companies respectfully reserve their individual and collective rights to appropriately modify the Proposed FIT to account for the continuation of any aspects of the NEM program.

provide a streamlined and standardized vehicle for the procurement of certain types and sizes of renewable resources at a reasonable cost, projects which qualify for the FIT should not be allowed to utilize the bilateral negotiation option to gain an unfair advantage over those projects which elect the FIT option. Accordingly, the utility should be under no obligation to offer a project which is eligible for the FIT the same pricing, terms or conditions that are available under the Proposed FIT, through the bilateral negotiation process. Similarly, a project otherwise eligible for the FIT should not be allowed to achieve a better position in the procurement queue as a result of the bilateral negotiation process but should retain the position assigned to such a resource pursuant to the queuing guidelines approved as a part of this proceeding.

Along these lines, the HECO Companies and Consumer Advocate would also object to any renewable resource under an existing negotiated bilateral agreement seeking to unilaterally void its contract in favor of a FIT rate and agreement. To the extent that an existing resource is no longer happy with the transaction that it negotiated at arms-length, the appropriate vehicle to seek to resolve that issue is to approach the counterparty to the agreement with a proposal for modification. The appropriate vehicle is not to allow the existing resource to cherry pick pricing, terms and conditions, particularly pricing, terms and conditions designed to incent new resources, at its sole discretion.

F. Competitive bidding: Should present practices be continued, without change, in the presence of a FiT? If not, what renewables (technologies and sizes) should present practices apply to and what renewables should FiT apply to?

On December 8, 2006, through Decision and Order No. 23121, the Commission adopted the Framework for Competitive Bidding ("Framework") as a mechanism for acquiring or building new energy generation in Hawaii. As noted in that Decision and Order, the

Framework's underlying principle is that competitive bidding (unless exempted or waived by the Commission for a specific project) is established as the required mechanism for acquiring a future generation resource or a block of generation resources. (Decision and Order No. 23121 at 3.) The Proposed FIT is not impacted by the Framework. The targeted project sizes of the Proposed FIT are less than the minimum project size thresholds of the Framework. The Framework does not apply to generating units with a net output available to the utility of 1% or less of a utility's total firm capacity, including that of independent power producers, or with a net output of 5 MW or less (on Oahu), and 2.7 MW (on Maui and the Big Island) whichever is lower. (Framework at 5) The HECO Companies and Consumer Advocate recommend that the Framework remain in place as competitive bidding is the best vehicle for discovering prices and to achieve the most economical pricing for ratepayers. This is especially critical for larger projects with their correspondingly larger ratepayer impacts.

Consistent with the Framework the HECO Companies are presently evaluating a short list of projects responding to HECO's renewable energy request for proposals ("RFP") and are in the process of developing a similar RFP for the MECO system. The benefits and objectives of a possible RFP for the HELCO system are presently being evaluated considering the status of several projects for which waivers were granted from the Framework. While the RFP process has been criticized by certain parties to this proceeding, it is evident from testimony during the panel hearings that the Commission's Framework is indeed working.

> *MODERATOR HEMPLING: Is there something about the competitive bidding process that makes it inhospitable to renewable energy, or is it a coincidence of timing, or what?*
>
> *MR. SEU: I believe it's primarily timing and the -- the process of implementing the – the framework. The framework was finalized in December of 2006. And, you know, the framework is very explicit 8 in terms of the requirements and the procedures, the role of the companies, the role of potentially an independent observer, for example, the role of*

public input. And for the Hawaiian Electric Companies, the HECO 100 mark megawatt renewable RFP was the first implementation of the process for us. It's possible that because it's a new process for us there were some, you know, several weeks of delay added here and there to the steps. But, by and large, we view that we've been able to move through that schedule for that RFP pretty much on time.

We published in the RFP an overall time frame of issuing a draft RFP in, I believe, February of 2008, and proceeding for -- through issuance of a final RFP in the fall of 2008, and ultimately submitting proposed PPAs for the PUC's approval by the end of 2009. And we are moving it all along according to that schedule.

It's, you know, it's a process which lends itself to transparency. It is a process where we are able to do the technical integration studies of all of the short-listed proposal simultaneously, in order to allow us to do -- to have a more complete view of the system integration requirements.

Transcript ("TR") at I-35, line 25 to I-37, line 7

MODERATOR HEMPLING: ... I'm not getting the message here about how it is that competition administered by the utility necessarily produces a, quote, "ruinous," closed quote, price. Has that been your experience, Mr. Seu, in terms of the competitive bidding that you have run, ruinous?

MR. SEU: No, we don't think it's a risk. You know, we issued the RFP for Oahu last year. We received a number of bids, variety of developers, variety of projects, lots of interest in working with that competitive bidding process and winning the bids. And as we sit here we are in the midst of running the interconnection requirement study for the short list of projects. And, you know, the -- I think our view is that, you know, the developers can provide competitive pricing. These are larger projects and, you know, ultimately the competitive bidding framework, we think, is appropriate for – for these -- these sized range of projects.

TR at I-50, line 8 to I-51, line 7

To the extent that parties have criticisms of the Framework, the appropriate regulatory body to address those criticisms is the Commission. The HECO Companies and Consumer Advocate would not be adverse to a proceeding which seeks to streamline the existing Framework to some extent but the HECO Companies and Consumer Advocate cannot modify the Framework unilaterally. Indeed, to the extent that a streamlined and more transparent RFP process could be developed, such a vehicle could be utilized by the Commission and parties to

this proceeding to expose prices both as a part of the price development phase of this proceeding, as well as for the FIT Update which may seek to develop pricing for eligible projects which are greater in size than those set forth in the Proposed FIT but which do not meet the threshold for competitive bidding under the Framework.

G. Proposed PV Host Program

Although it is not expressly addressed as a Commission decision point in Exhibit A to the Hearing Order, this section addresses the HECO Companies' proposed PV Host Program and how that program would interface with the Proposed FIT. As described in the HCEI Agreement, under the PV Host program concept the HECO Companies will contract for use of customer sites, and will competitively procure PV systems to be developed at these sites. As consideration for use of the site, the site owner would receive a site rental payment and/or use of a portion of the PV energy generated at their site. The PV Host program will primarily focus on development of systems at sites that can provide beneficial economies of scale and administrative efficiencies, such as large sites or multiple sites owned by a single entity such as a government agency. (HCEI Agreement at 12-13)

The HECO Companies have acknowledged that it may be possible to develop a FIT for larger projects, provided, however, that (1) adequate and relevant Hawaii project cost information is available to support establishment of just and reasonable energy payment rates, and (2) the projects be subject to a stand-alone interconnection and system integration review process. With larger projects, the cost of generation not including interconnection may be lower than smaller projects due to economies of scale. However, such economies of scale may be offset by higher costs of interconnection. In any case, due to the higher capital expense and

greater amounts of energy that would be produced by larger systems, it is particularly important to get the FIT pricing right in order to protect both ratepayer and developer interests.

The HECO Companies believe that it is prudent to develop further power purchase experience with larger PV systems – preferably based on competitive procurement processes – and to then apply such experience to the development of a FIT for larger projects. The HECO Companies believe the proposed PV Host Program – developing numerous PV projects larger than the proposed initial FIT through a competitive procurement process – will serve this need for PV projects up to 1 MW in size and can support the establishment of a FIT for larger PV projects in the first FIT update, two years after initial FIT implementation. If such a FIT is established for PV projects of the same size as that targeted in the PV Host program, the HECO Companies, in their review of the PV Host program towards the end of the two year pilot, would consider whether it is necessary to continue the PV Host program beyond the pilot.

II. What are the physical limitations on the utility's ability to purchase renewables?

The ability of a utility to purchase energy from renewable resources is unique to the characteristics of the existing power system including the existing mix of generation, transmission and distribution facilities. It is also affected by the mix of resources that is being integrated onto the system, the size, location, and operating characteristics of those particular resources, and the collective impact of these resources upon system reliability or security. Therefore, in order to understand whether any limitations exist upon the ability of a particular utility to purchase energy from renewable resources, it is necessary to understand the relative impacts (positive or negative) to reliability and stability for the various potential renewable energy sources that could be accepted upon that utility's system. In particular, the variability of the resource is a key determinant in the ability of the utility to accept the resource and the amount

of that resource that may be accepted. The attributes of intermittent or variable renewable generation that impact the reliability of the power system are:

- Variability : the amount of change according to the availability of the primary energy source (wind, sunlight and water motion) resulting in increased fluctuations in the plant output on all time scales
- Uncertainty: the ability to forecast the magnitude, timing, and duration of variable generation

Reliable system operation requires balancing of supply and demand at every moment in time, in accordance with prevailing operating criteria. The measure of successful power balancing on the Hawaii power systems is the system frequency. There is a certain amount of variability and uncertainty generally in system demand and, to a lesser extent, with conventional generation. However, large scale integration of variable generation significantly alters familiar patterns for the system. Even for larger variable resources which can have enhanced control features (such as ramp control, or curtailment control) these resources are not fully dispatchable, and therefore require use of other controllable or dispatchable resources to balance the supply and demand.

Thus, as all variable generation adds to the power imbalance, there is almost always an impact on reliability through the increased balancing error that will result from the addition. In addition to creating an imbalance on the power system, if operational practices allow the variable generation to displace some of the dispatchable generators from the system, complications increase due to the loss of the response capabilities from the dispatchable generation.

The amount of variable generation that can be accepted on a power system is ultimately dependent upon various factors such as:

- the characteristics of the variable generation such as rate of change, correlation with other resources, degree of possible change in a given time period, predictability of output, control capabilities, etc.
- the characteristics of the other controllable or dispatchable resources such as available ramp rate, frequency response, minimum load, startup time, etc.
- the minimum number of conventional generators which are necessary to provide for the reliable operation of the power system: as necessary to survive reasonably probable faults and disturbances, ability to regulate voltages, perform load balancing and frequency control
- operational configuration to mitigate reliability impacts and their costs, for example, the inclusion of increased reserves (minimizing displacement of dispatchable units)
- evaluation of possible technical solutions and their costs such as supplemental controls on the variable generation, modification of the dispatchable generation, infrastructure modifications
- Establishing minimum reliability criteria to be maintained on the power system

An additional challenge in evaluating these factors is that planning tools have not been developed to accurately capture the impacts of these types of resources on the power system. There are challenges in all planning time frames: difficulty in obtaining models for these resources for dynamic stability; lack of tools to capture the effect of the resources in the sub-hour time frame on system balancing and frequency control – coupled with lack of accurate data regarding the behavior of these resources in the intra-hour time frame; and lack of historical

information and forecasts to use for hourly production assumptions of variable resources to include in long range, month ahead and year ahead forecasts.

Due to these complexities, the actual operating experience from areas of high levels of variable generation is very valuable to provide insights into the reliability and operational impacts of variable resources. This experience shows that relatively small amounts of variable generation can typically be accommodated with minor impact on system operation. However, as the levels increase, the challenges become much more costly and difficult to solve. These experiences are influenced strongly by the factors listed above: for example, systems where variable generation is highly correlated due to clustering of wind plants or a correlation of outputs from solar and wind facilities have had greater impacts on reliability than systems where the production is more dispersed. As discussed above, the island grids in Hawaii have fewer options than interconnected systems, due to the limited geographical area and isolation of the grids.

For example, the HELCO power system has significant variable generation in its generation mix, provided from wind, run-of-river hydroelectric, and most recently, distributed PV generation. This provides a good basis to evaluate the relative impacts of these energy sources on the power system.

The impact of the hydroelectric resources on reliability, although non-dispatchable, has been minimal. This is because the output of these facilities is relatively constant. During periods of rain, the output will increase steadily, and during dry periods, the output will decrease steadily. These resources are not extremely variable and are fairly predictable, and thus do not contribute to balancing error on a minute-to-minute and hour-to-hour time scale. The most significant impact on reliability from these hydroelectric resources is the displacement of dispatchable

resources which are more responsive during system disturbances.

By contrast, the impact of wind energy on the HELCO system has been very significant because the output varies on the second-to-second and minute-to-minute time scale. The output of each wind plant can decline from full output to zero in a very short time period. The addition of the HRD wind plant (10.5 MW) resulted in a measurable increase in average frequency error and required modification of the Automatic Generation Control ("AGC") system. The impacts of this wind plant on frequency control and load balancing is documented in the report: *EPRI Evaluation of the Effectiveness of AGC Alterations for Improved Control with Significant Wind Generation. EPRI, Palo Alto, CA: 2007. 1018715.* The addition of a second wind plant, the 20.5 Pakini Nui facility at the South part of Hawaii Island, had significant additional impact on frequency control. Wind plant variability has become the primary driver for frequency error on the HELCO system. A statistical analysis of these impacts, discussion of specific events and possible mitigation measures are documented in the report: *Evaluation of the Impacts of Wind Generation on HELCO AGC and System Performance – Phase 2. EPRI Palo Alto, CA: 2009. 101876.*

The reliability impact of these wind resources has been significant on two time scales. In the fast time scale, second-to-second variations required the control dead band on frequency to be expanded to avoid exacerbation of error through supplemental control actions by AGC. During off-peak conditions this dead band is approximately +/0.2 Hz, an amount of frequency error considered an emergency and alarmed to the operator. This variability is illustrated in the following figure:

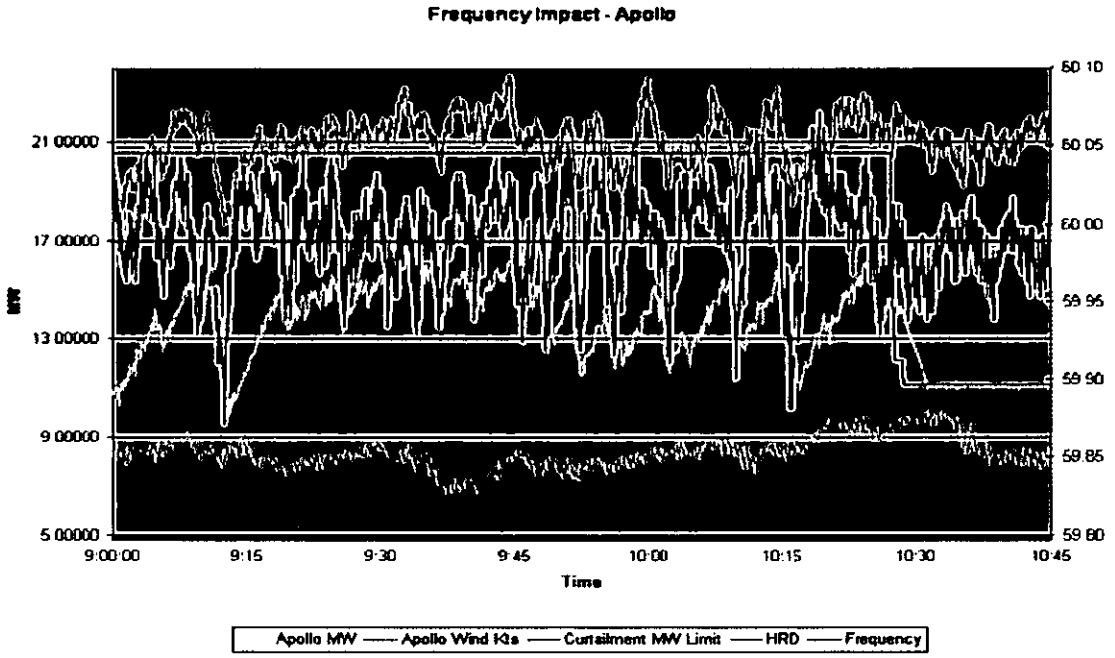


Figure 7

In this example, the influence of the Apollo output (yellow) can be seen on the HELCO system frequency (dark blue). When the Apollo output is reduced and made steady through application of a curtailment control, after time 10:30, the system frequency becomes more stable.

In the minute-to-minute time scale, sustained ramp events which may involve one wind plant, or a combined drop from both wind plants, have at times resulted in significantly low frequencies, as illustrated in the following figure:

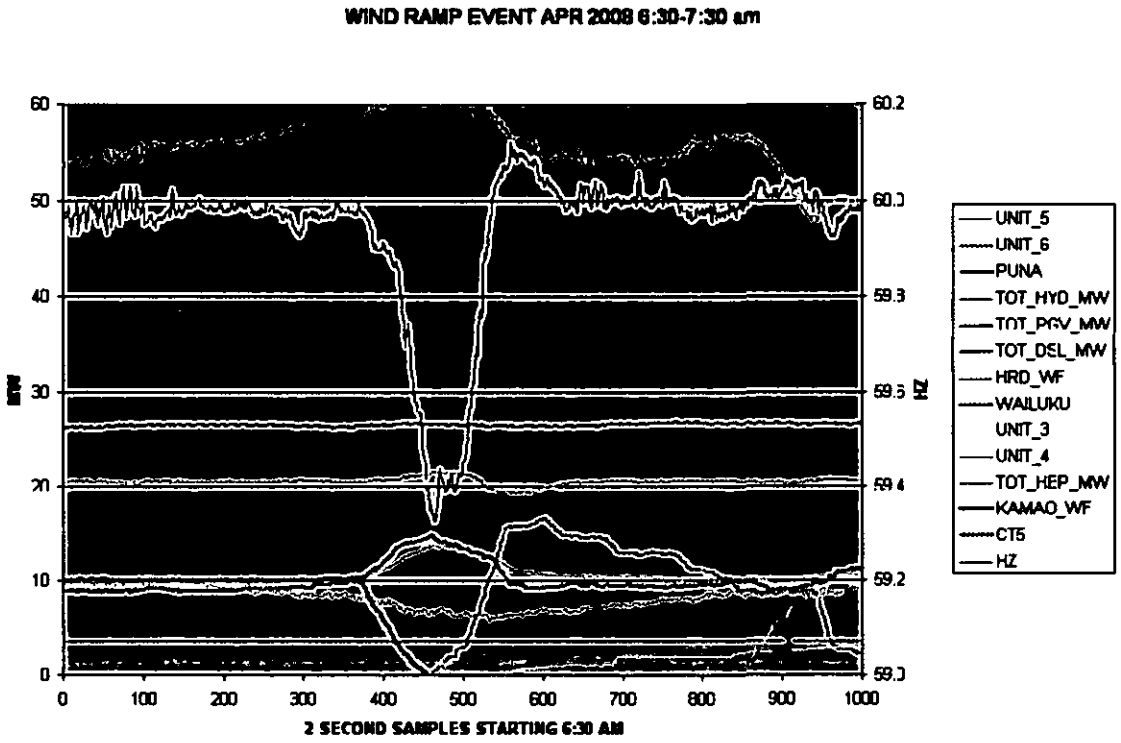


Figure 8

This event occurred during the time of the load ramp. The time scale begins at 6:30 am. The output of the Apollo facility (labeled Kamao_WF) drops from 10 MW to zero within three minutes. At the same time, the output of the HRD wind plant drops more gradually by 3 MW. The combined 13 MW decrease, occurring at a time of load increase resulted in frequency decline near 59.3 Hz (dark blue). The system operator recovers the system balance and frequency by starting diesel units (royal blue). Instantaneous load shedding at the time of this incident began at 59.0 Hz. This has subsequently been modified to 58.8 Hz, and a time-delayed trip of 20 seconds for frequencies below 59.3 Hz. Distributed generators connected with minimal IEEE 1547 protection settings disconnect at 59.3 Hz.

Accommodation of the variable generation, which is taken ahead of dispatchable generation as long as the system can accommodate the energy, with consideration of minimum load and must-run units, has resulted in excess energy conditions during lower-demand periods. During these periods, responsive generation is at a minimum and variable generation is often curtailed. In this configuration the HELCO system is susceptible to over-frequency conditions as there is limited ability to respond to loss-of-load events. This is illustrated in the following

figure:

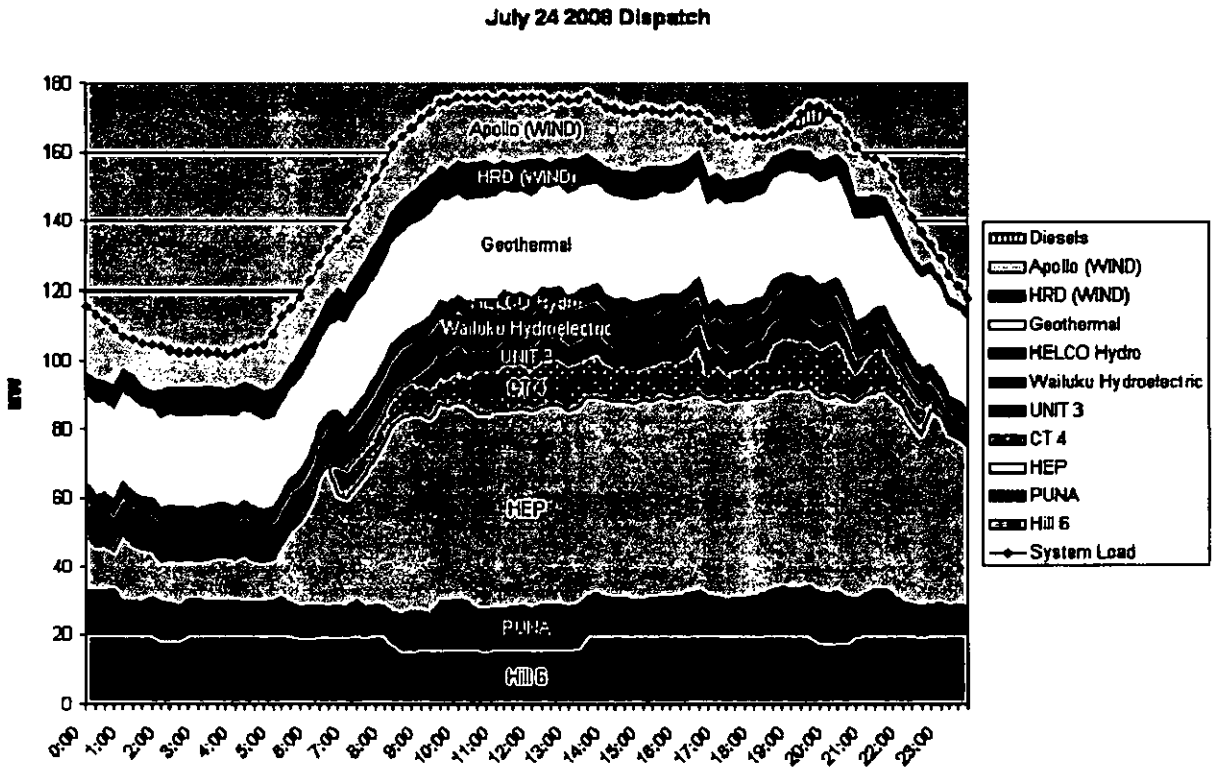


Figure 9

This illustrates the generators providing energy through the 24 hour period July 24, 2008. The units in grey provide droop response and frequency regulation. During off-peak hours, only HEP, Puna and Hill 6 provided these services necessary for stable system operation through faults and to balance generation and load. These units were reduced near their minimum dispatchable output to accommodate renewable energy from wind, hydro, and geothermal resources, with consideration for a minimum amount of regulating down reserve.

In the past few months, a significant number of customer-sited PV projects have been connected to the HELCO system. Some of these projects are small residential projects, some under NEM, and others are commercial projects. These projects are connected to the distribution system and are not telemetered. As illustrated in the following figure, PV systems can be highly variable:

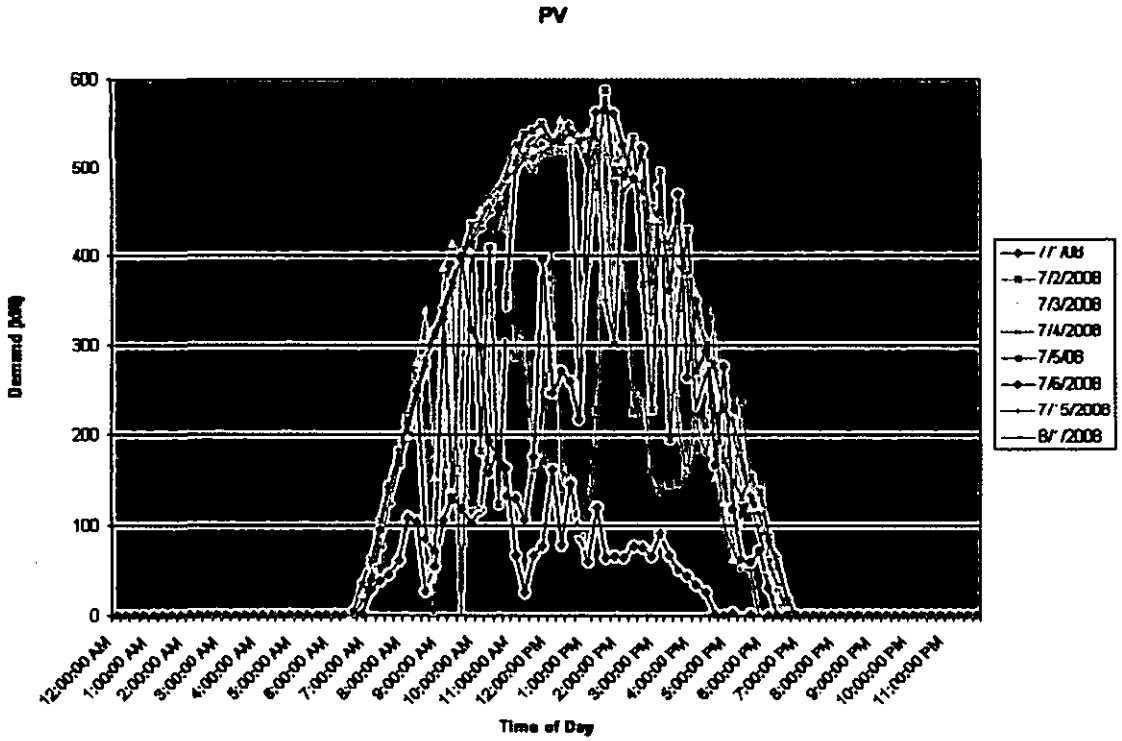
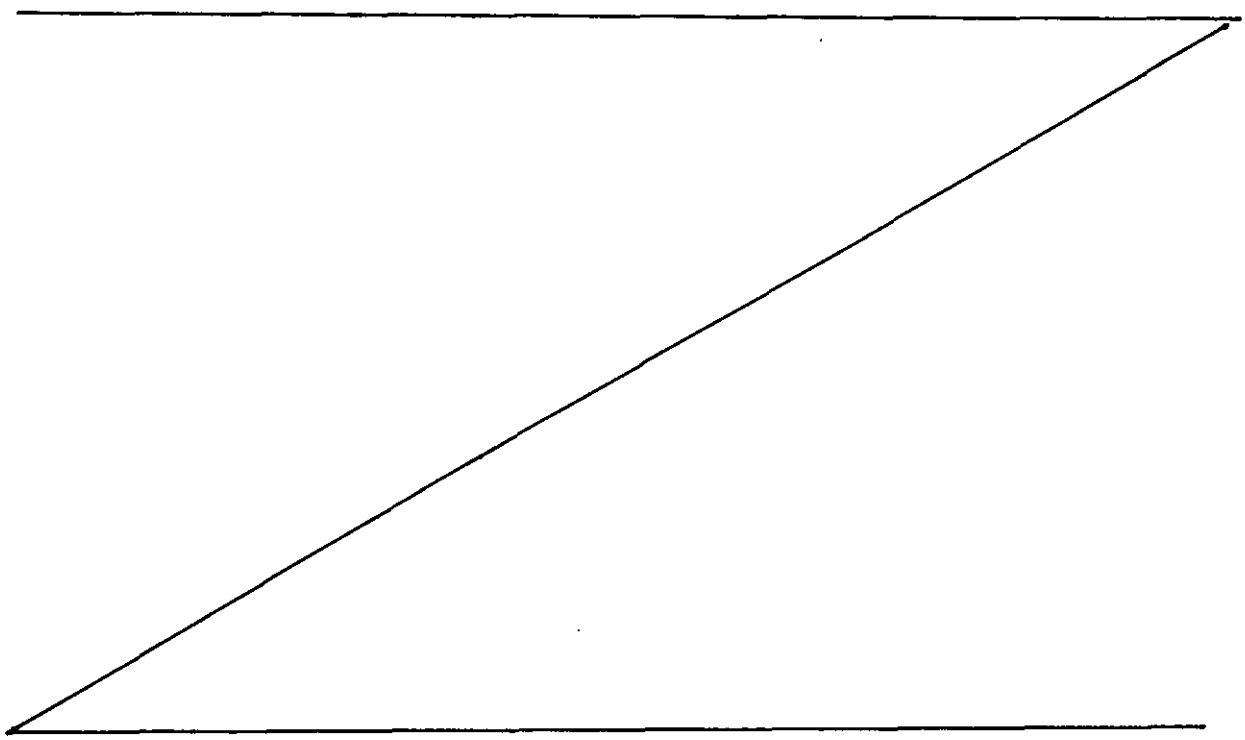


Figure 10

An illustration of the variability of output from a PV installation in West Hawaii for eight different days. The data was collected at 15 minute intervals over 24 hours for each day.

The result of these types of increases in variable generation has resulted in both HELCO and MECO experiencing very real system issues. Both utilities have a frequency bias of 2-3 MW/0.10 of Hz. This means that an increase of 2-3 MW affects the System Frequency by 0.10 Hz. As of February 2008, HELCO has approximately 5.8 MW of distributed generation on its system (not including four 1-MW utility-owned units installed at distribution substations), with another 4.1 MW planned to be installed in the near future. All of the existing distributed generation units were installed using the minimal interconnection requirements specified by the IEEE 1547 standard which states that the generating facility be equipped with protective equipment designed to automatically disconnect the generating facility from the utility

distribution system when the frequency at the Point of Interconnection deviates outside the normal operation range of 59.3 – 60.5 Hz. The result is that a loss of generation, such as has occurred from a sustained ramp down in output from a wind plant on the HELCO system, can result in the HELCO system frequency excursion that causes generation connected according to the minimal IEEE guidelines to disconnect, quite likely resulting in a drop of frequency to 59.0 Hz and under frequency load shed. To mitigate the impact of existing and near-term distributed generation (DG) projects connected according to minimal IEEE 1547 guidelines, HELCO has requested that larger DG installations utilize expanded ride-through capabilities that coordinate with the utility's under frequency load-shed scheme. However, technical limitations associated with commercially available equipment make this infeasible for smaller systems, such as residential solar projects typical for NEM. The MECO system has the potential to experience this same effect although distributed generation penetration is not as high on the MECO system as on HELCO's.



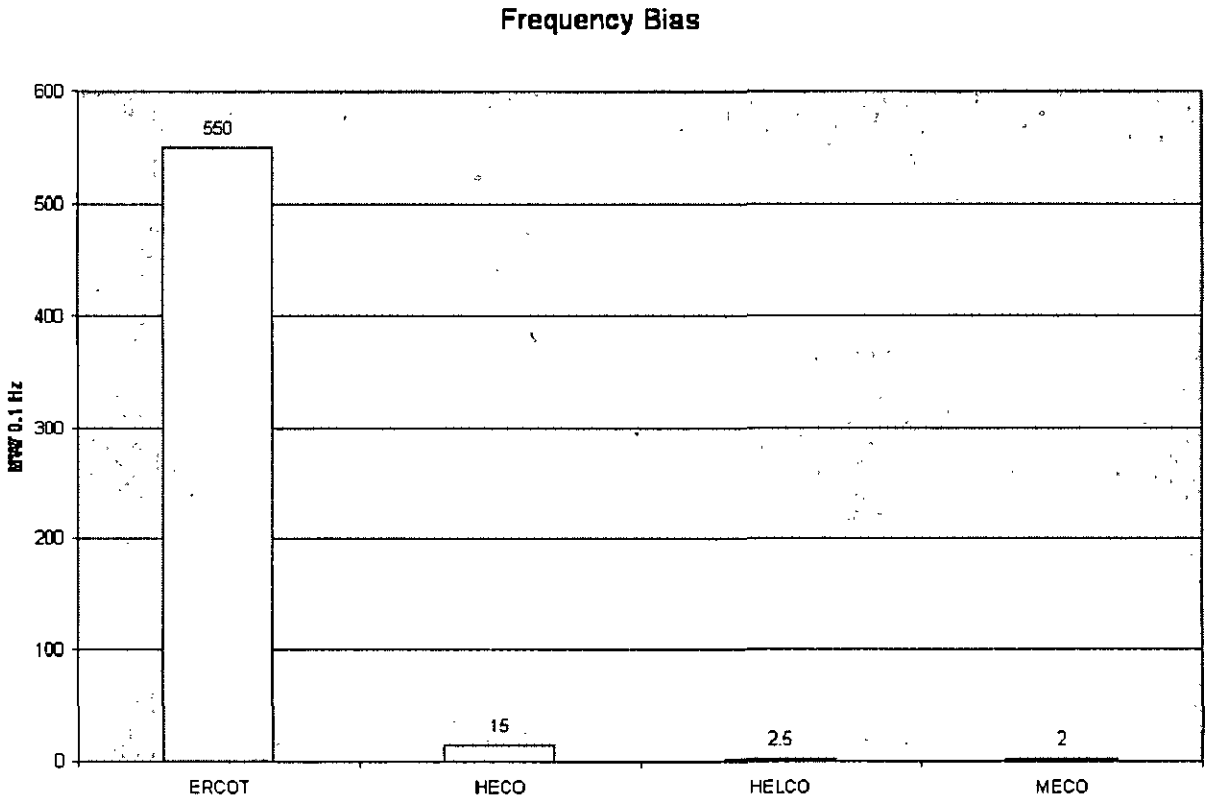


Figure 11

This chart shows the relative sensitivity to power imbalances in the Texas interconnection (ERCOT), HECO, HELCO and MECO systems as measured by the average frequency bias. The frequency bias indicates the amount of power imbalance in MW required for a 0.1 Hz change in frequency. ERCOT is the smallest interconnection in the mainland U.S.

The HECO system carries 180 MW of spinning reserve and accordingly the system stability issue described above is not as prevalent on the HECO system. Therefore, it is reasonable to allow for a higher FIT project limit for resources on this system taking into account the current resource mix on the system. A detailed examination of the HECO distribution system supports the 500 kW limit contained in the FIT Proposal. In evaluating appropriate limits for the HECO system, HECO engineers reviewed the Company's 12 kV feeders (which is the level where most of the FIT resources would interconnect). Load on those circuits ranges from 400kW to 13 MW. The 400 kW circuits exist in areas where there may be a potential for distributed

generation such as in the airport industrial area. Thus a project size of 500 kW on one of the existing 400 kW circuits will immediately require modification to the protection schemes on those circuits.

Additionally, the average load on a 12 kV HECO circuit is 2-3MW. Thus a 500 kW project would represent approximately 20 percent of the load which is a significant amount of the load on the average circuit. Put another way, increasing the proposed limit up to 5 MW as some in this proceeding have proposed would result in the potential generation on a circuit being almost twice the amount of the corresponding load on that circuit which would require modification to the protection schemes and voltage regulating equipment on those circuits. While it is possible to implement these types of modifications, they should not be undertaken without a demonstrated need or without an appropriate evaluation of the cost relative to the resource to be added – factors which are considered as a part of the utility's other procurement mechanisms for projects of this size.

HECO system operators use a combination of automatic voltage regulating equipment installed in the field on a circuit (i.e., load tap changers, capacitor banks, etc.) or actions the system operator performs using the Energy Management System ("EMS") to adjust voltages throughout the day. Customer load is not constant through all hours of the day and as the customer load changes, voltages and currents through the distribution circuits will change. The automatic devices in the field and the actions of the HECO system operator using EMS control serve to manage the voltages within tariff levels. Typically, the HECO system operators are concerned about high voltage conditions where generation is injected to the distribution system. Under the current design of the HECO system, the substation transformer controls the voltage using load tap changers. The tap changers are designed for relatively slow operation (in the

minutes to hour time frame) because customer load on the distribution system typically experiences slow changes over time. By incorporating a variable generating resource such as PV on the distribution feeder, the tap changer may need to operate in the seconds time frame resulting in considerable wear and tear and the likely need to replace the infrastructure. Even in a situation where the FIT resource could install expensive solutions to regulate the voltage at the point of interconnection, a study would be required to determine if the FIT resource's voltage control system will coordinate with the HECO-designed voltage control system. Absent confirmation that the voltage control systems will work together, a possible result is that the voltage control resources will work against each other creating unacceptable voltage oscillations on the system.

While it is possible to integrate larger sized projects on the HECO and other island systems, this requires appropriate analysis and resource and system modifications to address technical issues and ensure that reliability is not adversely impacted. This level of study and modification is not well suited to the standardization of procedure that is desired as part of a FIT design which seeks to simplify and expedite the interconnection and contracting processes. Accordingly, it is necessary as part of an initial FIT design to incorporate reasonable limits on project size and system penetration. As FIT resources are added on an incremental basis, the impacts, both positive and negative, of these resources can be evaluated to determine and plan for the infrastructure and operational modifications that are necessary to responsibly integrate even higher levels of FIT resources in subsequent updates to the FIT program.

A. Concerning standards and procedures to ensure that FiT sales promote reliability: Should they be part of the tariffs, or should they exist outside the tariff (e.g., in interconnection rules or in project-by-project negotiations)?

The standards and procedures to ensure system reliability that the Hawaii system operators work to comply with are largely set forth, either expressly or by implication, in the Commission's General Order 7. While these standards and procedures are not necessarily amenable to inclusion in either a tariff or through interconnection rules, the standards and procedures should be appropriately captured through adoption of the initial limits on size of project, technology and annual capacity by island, set forth in the Proposed FIT.

Voltage Standards

With respect to voltages on the system or a distribution feeder, there are tariff standards which the HECO Companies are required to meet. Specifically, Section 7.2 of General Order 7 states that the utility must operate its grid within certain defined ranges depending on the relevant voltage level. At the secondary voltage level which is generally where customers connect their end-use devices to the utility system, voltages must be within 5-7 ½% from nominal. For distribution feeders such as a 12kV feeder the voltage variation must be no more than +/-5% from nominal. Transmission voltages are +/-10%.

The addition of generation onto the system affects voltages on the system. Voltages are typically higher at the point of interconnection and decrease further from the generation source. Thus an interconnecting generation resource should have the capability to operate within tariff levels and should not be allowed to affect voltages on the feeder to the extent they operate outside of tariff levels. Both the type of generation and the size of the generation resource affect voltage levels with the voltage level issue generally being impacted more by larger resources.

Protection Systems

Current protection systems are designed for one directional flow. Settings on the relays which initiate the protection scheme are typically based on voltage and current limits designed to

isolate fault conditions. The addition of generation onto the distribution circuit begins to alter the magnitude and angle of currents and voltages on the feeder which if not changed, could cause the protection schemes to misoperate (i.e., breakers do not open under fault conditions or fuses do not blow to isolate the faulted section of line). Misoperation of a protection scheme could damage or could affect the operation of customer and utility equipment. Two-way flow could also cause nuisance tripping of customers if the protection scheme is not coordinated. For instance, normal operating currents with distributed generation could be near current levels for fault conditions which then could trigger the protection scheme of a circuit causing the circuit to trip for normal operating conditions without a fault. This analysis is already triggered by the 10% threshold of peak load. Flow reversal would occur only when the generation is greater than 100% of the demand, at any time; but it is unlikely this would occur when the generator is 10% of the peak demand on the circuit. It would only occur if there is a big difference between minimum load on the circuit and peak load on the circuit.

One method to address this issue is to set a "trigger" which requires additional study when the current flow on a circuit changes direction. This is already represented in Tariff Rule 14.H at 10% of feeder peak. Distribution feeder sizes on the HECO system based on recent spot reading data range from ~400 kW to as high as 13 MW. Thus a project size of 400 kW or more would change the direction of the current flow on some feeders

Based on the size of the distribution circuits at the three utilities, FIT projects at the maximum proposed size of 500 kW for HECO and 250 kW (MECO/HELCO), will require additional analysis per Tariff Rule 14.H (10% of the peak load) to determine the impacts and necessary interconnection requirements. The proposed sizes will exceed what could be accommodated without significant infrastructure modifications, or negative reliability impacts,

on some of the smaller circuits. However, this size of project can likely be accommodated without risking negative impacts on neighboring customers on the circuit if proper infrastructure and requirements are in place as identified in the interconnection study

System Thresholds

Section 7.1 of General Order 7 concerns standard frequency. The section provides that the standard frequency for the distribution system for HECO/HELCO/MECO shall be 60 cycles per second or 60 Hz. The standard also calls for the utility to maintain the frequency within limits which will permit the satisfactory operation of customer's clock connected to the system. For HECO/HELCO/MECO this is the GPS clock time. As described above in the explanation for frequency regulation, system frequency measures the balance of demand and production. Frequency is controlled by a combination of local generator response and supplemental control by AGC, through the utilities Energy Management System (EMS). The local response is quite fast, but there is a time lag for supplemental controls as the frequency error is measured by the automatic generation control program (AGC) on the EMS, and then raises or lowers the output of regulating generating units controlled by the EMS to correct frequency. This occurs on a cycle of several seconds. Variable generation can change quickly, which introduces variations in frequency on a fast time scale. It has been necessary to apply a larger control deadband on system frequency error for supplemental frequency control for islands with high wind penetration, simply because the variations occur faster than the supplemental control cycle and because these variations are unpredictable. The addition of variable generation resulted in increased average frequency error and greater magnitude of frequency error under non-disturbance conditions than occurred prior to the addition of variable generation. The variable generation has become the primary driver of frequency error under normal operations for these

high wind penetration island systems. The average frequency deviations are accumulated and tracked as time error. The larger the time from 0.000 seconds translates into poor control of the system frequency by the existing generators on-line. The frequency and time error is also affected by changing generation. Thus variable generating resources will affect the system frequency and time error.

Operation at very off-normal frequency can cause equipment problems, particularly for large motors and generators. But most significantly, frequency is a measure of system security. The further the power system deviates from the target, the more vulnerable the power system is to system failure for faults and disturbances. System balancing and frequency control is one of the primary measures used by NERC in evaluating system operation performance for the North American Interconnections. The standards for frequency control are much tighter for the interconnected North American power systems than can reasonably be achieved by the smaller island systems. These systems are not subject to NERC operating criteria. Although not subject to quantitative frequency standards, it is essential for each power system to minimize the frequency deviations as much as feasible in order to preserve system security through faults and contingencies. It is the objective for each of the island systems that any additional variable generation be integrated while maintaining the present frequency performance. For HECO, the proposed standards in the model PPA provided to bidders in the 100 MW RE RFP and the three grandfathered projects currently in negotiations reflect this philosophy when calculating the power fluctuation performance standard. For the HELCO system, the additional variable generation has reduced system performance and at times the frequency error exceeds +/- 0.2 Hz error, which is the threshold for operator intervention. HELCO has implemented several changes to system operation, and is researching other measures, to mitigate the impact of existing variable

generation sources on frequency regulation. MECO has experienced similar effects on system frequency control following the addition of the large wind plant.

As both the HELCO and MECO systems have experienced degradation in the ability to control the system frequency compared to pre-wind farm conditions, there is a need to limit additional variable generation on the power system at a system level to avoid exacerbating existing frequency control issues (this is different from a project size limit). Other factors on the HELCO/MECO system may dictate a specific system wide limit. For instance HELCO is proposing a system limit on projects which have ride through capability conforming to minimal IEEE 1547 standards, in order to avoid excessive loss of generation during low-frequency conditions, which would further reduce frequency.

Interruption of Service

GO7 also has a qualitative standard for the interruption of service. It states that the utility shall make reasonable efforts to avoid interruptions of service, but when interruptions occur service shall be re-established within the shortest time practicable, consistent with safety. Current operational guidelines for HECO are to maintain a spinning reserve equal to the loss of the largest unit. If the AES coal fired unit is on-line this equates to 180 MW. If AES is at ½ of its output or off-line for maintenance the next largest unit is Kahe 5 or 6 at 142 MW. Operating under this operational guideline typically results in no interruptions of service if the largest unit on the system should disconnect from the system.

As variable generation is added to the HECO system, if the variable resources experience a ramp down event or a complete shutdown, this will decrease the amount of spinning reserve until the HECO dispatcher is able to get additional off-line generators connected to the system. On the HECO system there are limited quick-start generators such as the 30 MW of 1.5MW-

sized substation diesel units which are able to come on-line and ramp to full load within 3-5 minutes. Thus in a hypothetical situation where a 30 MW wind farm experienced a downward ramp from 30 MW to zero, during the 3-5 minute period in which the dispatcher is starting the quick start diesel generators, there is a risk to the system for load shed if a dispatchable generator should trip off-line or additional variable generators significant in size should ramp down. The next increment of generation would be the combustion turbines at Waiau or the new unit that is being installed at CIP which have longer start times compared to the 1.5 MW diesel units, but relatively quicker starting times compared to a HECO steam unit. A CT unit is able to connect to the grid within ~ 10-20 minutes with the ability to increase its output at a ramp rate of about 10-20 MW/minute. The capacity of a CT is ~100MW for CIP and ~50MW each for the Waiau CT units. Thus in a hypothetical situation where 200 MW of variable generation was suddenly lost or ramped down with 180MW of spinning reserve, the loss of another conventional unit such as AES at 180 MW could result in load shed if during the 3-5 minutes the system is starting the DG units or during the 10-25 minutes the CT units are starting up. This could result in total cumulative system limits for the Proposed HECO FIT of 30 MW, 50 MW (1CT unavailable), 100 MW (CIP unit unavailable or 2 Waiau CT units not available) or 200 MW depending on how quickly the utility was required to address the spinning reserve deficit.

The HELCO and MECO systems are operated under a different philosophy in order to manage costs. Neither system requires contingency reserve (spinning reserve equal to the largest single generator contingency). Both systems carry regulating reserve sufficient to follow demand and regulate frequency. Demand variability considers both load changes and variable generation output from sources such as the wind farms and aggregate impacts of the distributed PV on the system. For large reductions in generation, which exceed the amount of regulating reserves on

the system, the frequency will decline. HELCO and MECO's system operators start off-line fast-start units as the primary action in response to occurrences of low frequency. If standby generation cannot be brought online fast enough to compensate for the reduction in generation, the frequency will drop low enough for the automatic underfrequency load-shed to operate. These schemes shed load at very low frequencies in order to prevent extended operation at very low frequencies, which if unchecked would result in cascading outages and system failure. Thus if the output of an existing wind farm begins to ramp down or another dispatchable generating unit trips off line an alarm point triggered by a system frequency deviation of 0.2Hz away (or less in certain circumstances) from 60 Hz or more may cause the system operator to start the quick-start units. If the frequency continues to decline to 58.8Hz or more, or remains at 59.3 Hz for 20 seconds or more, customers will be shed under the underfrequency load shedding scheme to bring the system in balance. Customers are restored as standby generation is brought on the system. The HELCO and MECO systems have a frequency bias of about 2-3MW per 0.10Hz, which means a sudden change in load or generation (either loss or addition) of approximately 2-3MW changes the system frequency by 0.1 Hz. Thus the loss of 20-30MW would result in the frequency deviating to 58.8Hz which would then trigger the underfrequency load shed scheme and loss of customers. A fast ramp down of the existing 30 MW of wind generation on HELCO and MECO would result in enough generation drop to drive the frequency to below underfrequency load-shed. There have been numerous occasions where significant frequency deviations have occurred that were very close to the first tier of underfrequency trips, but the system operator prevented the loss of customers by bringing quick start units onto the system. The addition of smaller distributed variable generators through a FIT could decrease the frequency further if they trip off-line at the IEEE 1547 level of 59.3Hz causing further

degradation of frequency which could result in additional load shed. Thus there may be a need to provide a system wide limit on the amount of distributed generation on the system.

Appropriate Limits on Project Size and System Penetration

One of the greatest challenges to maintaining system reliability and power quality is uncertainty regarding the addition of new resources onto an island grid. One way to reduce the level of uncertainty is to set certain reasonable limits upon the size and system penetration of FIT resources during a particular period of time. In this way, a system operator can have at least some ability to forecast the size of resource that will come onto the grid through a FIT and the maximum amount of that resource that can be expected during a given defined period of time. Appropriate limits are consistent with the directives contained in the Commission's Scoping Paper:

> *Overall caps on the amount of electricity purchased under PBFiTs are reasonable to consider, as the above-market price paid for electricity under a PBFiT places upward pressure on the retail price for electricity. *** A regulator may want to consider the total impact the Clean Energy Infrastructure Surcharge (CEIS) has on retail rates, not just the impact of the PBFiT purchases when setting a cap. Caps could be set so that when a utility meets its RPS goal, PBFiTs are not available to additional projects. Caps can also be placed on installed capacity, expected production, or rate impact (e.g., the difference between the purchased cost made under a PBFiT rate and an avoided-cost rate compared to total retail revenues).*

(Scoping Paper at 8)(Emphasis supplied)

The need for reasonable limits is perhaps best illustrated in answer to a common question raised in this proceeding: "what is the limit?" As discussed above, the answer to this question is dependent upon any number of factors including but not limited to: (1) the island grid system which the resource is being integrated with; (2) the existing level of penetration of renewable resources on that system and the system's ability to accept more of a particular resource; (3) the type of resource and the operational characteristics of that resource; (4) the size of that resource

and the expected deliveries to the system; (5) the location of that resource both geographically and in relation to existing distribution and transmission infrastructure; (6) the ability of that particular infrastructure to reliably accept the new resource; and (7) how renewable resources are being integrated from each and all of the utilities' other renewable resource procurement mechanisms and initiatives.

The following brief examples assist in illustrating the point: (1) addition of multiple 250 kW PV resource on unconstrained portions of the HECO distribution system may not have any significant impact upon HECO system reliability while addition of those same resources to an already constrained HELCO system may raise significant operational concerns which would have to be remedied, to the extent possible, either through the addition of costly grid infrastructure or operational actions to attempt to manage the new resource (also at a potential cost if other less costly renewable resources must be curtailed or reduced or more expensive resources dispatched as part of the grid management process); (2) addition of a significant amount of variable wind resources in a particular location on the system may result in the utility not being able to accept any additional variable generation at that location; and (3) the addition of a resource which could provide grid benefits (dispatchable, load following and able to provide ancillary services as an example) could be accepted at a particular location on the HELCO system, whereas a variable generation resource could result in unacceptable system impacts because it is non-dispatchable and would likely contribute to existing balancing issues on the HELCO system resulting from existing variable generation projects.

Accordingly, in an attempt to reduce the uncertainty associated with a FIT program without limits of any kind, the FIT Proposal sets reasonable project size targets for those resources initially eligible for the FIT. The proposed limits would allow for the largest number

of individual projects (rather than the entire eligible capacity being taken up by a single project) while also facilitating the ability to offer standardized pricing, terms and conditions and interconnection requirements which would not be available for other types of resources and project sizes due to the complexities and uncertainties that would be associated with the interconnection and integration of those types of resources onto the Hawaii island grids.

In summary, the proposed limits set forth in the Proposed FIT are established so that the established standards which the utilities are required to meet can continue to be met in the presence of a streamlined and standardized FIT process which will not require extensive study of each individual project to determine impacts and the ability of the utility to maintain the standards with the project on line. As more experience and information with the program is collected and evaluated over time, the Proposed FIT may be able to be expanded or modified while maintaining both the standardized nature of the Proposed FIT as well as the ability to meet the General Order 7 standards discussed above. In essence, the question posed in designing the Proposed FIT is how to best ensure that the utility can maintain system security, avoid outages and avoid damage to both customer and utility equipment while at the same time avoiding a complete bilateral negotiation and interconnection study for every project under the FIT. The answer to that question is the design of the Proposed FIT.

The Proposed FIT does not foreclose the possibility of accommodating larger projects in the future. In fact, because of the greater flexibility provided by the Oahu grid, HECO supports the notion that a FIT can be established for larger projects of certain technologies on Oahu, perhaps up to the 5 MW threshold for the Framework for Competitive Bidding. Before establishing such a FIT, however, one must establish appropriate energy pricing for such projects

and address interconnection requirements, as projects of this size have not heretofore been developed in Hawaii.

Regarding pricing, HECO believes that the most appropriate mechanism to establish a sound pricing basis for a future FIT for larger resources up to the 5 MW limit of the Competitive Bidding Framework is to conduct a competitive solicitation for such resources in the near term for Oahu. Such a solicitation could be prepared and issued in a relatively quick timeframe – in a matter of months – to provide valuable pricing information well in time to be considered in the first FIT update two years from the initial establishment of the FIT. Furthermore, if HECO is able to reach agreement with owners of large land areas willing to provide their sites for renewable energy development, the solicitation could target development of multiple 5 MW or smaller renewable projects consolidated in one or more geographic areas. Such an approach would allow greater efficiency in conducting interconnection requirements studies, development of common electrical infrastructure to support interconnection of the multiple projects, and negotiation of land use agreements between the land owners and renewable developers. HECO is currently evaluating the construct of a request for proposals ("RFP") to develop multiple PV farms of 5 MW or less on Oahu which could be issued in the calendar year 2009, to support project developments in the 2010 - 2011 timeframe as well as establish a FIT for larger PV installations by the time of the first FIT update. Note that HECO is not proposing that competitive bidding be used as the preferred contracting mechanism for projects of such sizes on a continuing basis. To the contrary, the RFP would be intended as a means to establish a sound basis for development of the FIT for larger resources.

Regarding interconnection, the HECO Companies and the Consumer Advocate have presented clear evidence of the difficulty in standardizing interconnection reviews and

requirements for projects larger than those provided in the Proposed FIT. Unlike the Proposed FIT, a FIT for larger resources could not feasibly assume standard interconnection requirements or costs. As such, if a FIT is developed for larger resources on Oahu, it would be necessary to bifurcate the interconnection review process and corresponding interconnection contractual requirements from the non-interconnection issues and contract terms and conditions (including pricing) which could be included in a FIT. HECO is willing to give further consideration to this approach, in the interests of supporting the development of a FIT for larger resources on Oahu in the first FIT update.

III. What are the appropriate criteria for eligibility to sell under FiT tariffs?

A. Which technologies should be eligible for the FiT?

HECO and the Consumer Advocate recognize the desire to encourage development of the full variety of resource types and technologies listed in HRS §269-91. However, as noted in the December 11, 2008 PUC Scoping Paper:

> Within each of these listed technologies, there may be subsets such as onshore wind versus offshore wind, biomass from varying feedstocks, or project size. A residential rooftop solar PV installation, for example, has a different cost structure than a large-scale solar PV installation. Location may influence the underlying costs of a project (e.g., public land on Oahu versus private land on Kauai). What is the cost and availability of real estate? What is the proximity to transmission and load? Are the underlying cost factors different on different islands for the same technology such as geothermal? These questions and others must inform tariff design.
>
> With probably over a dozen different technologies, some of which require further segmentation by size or location, the number of PBFiTs needed is large. The Commission may wish to focus on PBFiTs that merit priority attention based upon the projects under consideration, or that might be more likely candidates for consideration based upon the existence of a reasonable PBFiT.

(PUC Scoping Paper, page 6)

HECO and the Consumer Advocate agree that initially, the FIT should target those technologies that are actively being developed in Hawaii and on project types and sizes that are more straightforward to implement and lend themselves to use of standardized energy rates and power purchase contracting. Focusing on these resources will allow the Commission and stakeholders to more readily develop the initial FIT. HECO and the Consumer Advocate stress that the FIT should be regularly reviewed to encompass more technologies, and propose to do so within two years of the initial FIT, with ongoing reviews as part of the CESP process.

Thus, the proposed FIT initially targets renewable resources that (1) do not require complex environmental and land use permitting which may impose significant uncertainties in project development timeframes and costs; (2) do not inherently, by virtue of their operating characteristics and size relative to the utility system, require extensive and lengthy interconnection studies which may identify the need for significant interconnection requirements; (3) do not trigger complex financial accounting issues relative to utility power purchase contracts, and (4) have already been, or are currently in the process of being, implemented in Hawaii in commercial (non-R&D) application.

The first criterion refers to environmental permits and review processes including HRS §343 environmental assessments and impact statements, covered source air permitting, and changes in zoning. Each of these processes requires significant time and resources, and approval is at the discretion of the permitting or review agency. Furthermore, potentially costly project modifications may be required by the reviewing agency, which could significantly impact project economics and timing.

Similarly, the second criterion refers to the fact that larger generator sizes and certain technologies will inherently increase the potential for utility grid impacts, and will require more

extensive technical review and requirements to safely and reliably interconnect to the utility grid. For example, larger, "central station" generating resources must go through a complex interconnection requirements study ("IRS"). Even "distributed generation" resources interconnecting into distribution circuits may trigger the need for more extensive studies and interconnection requirements. As discussed elsewhere, the proposed FIT adopts the HECO Companies' Interconnection Tariff Rule 14.H to ensure that safety and reliability are not compromised. One of the critical technical issues is the aggregate penetration of generation resources on a distribution circuit. In Rule 14.H, a more extensive interconnection study may be triggered if the aggregate penetration of generation resources on a circuit exceeds 10 percent of the circuit peak load.

With regard to the third criterion, complex utility accounting issues must be addressed for each type of long-term arrangement the utility enters into. Considerations in the accounting assessments include: the type of fuel source (i.e. sun, wind, waves, biomass), the maturity of the technology, the reliability of the technology, the structure of the payments (i.e. per kWh delivered, per kW available, penalties, bonuses), and the nature of the contract (i.e. firm, as-available, scheduled, etc.). These accounting issues have been addressed for existing and proposed power purchase agreements and certain accounting conclusions are reasonably applied broadly to some technologies. For example, as-available PV and as-available wind power purchase agreements to date have not resulted in capital lease obligations being recorded on the utility's financial statements. Other technologies which have other characteristics might result in different accounting conclusions. Arrangements which reflect a contract for use of the asset may result in different accounting treatment (e.g., a capital lease obligation being recorded), which may have different financial consequences to the utility. For instance, an arrangement that

results in a capital lease may impact the financial structure (i.e. debt/total capitalization ratio) of the utility, which could have an impact on the utility's cost of capital. These accounting issues will ultimately be resolved in the course of other Commission proceedings or processes, but the timing of such may not support the desired timeframe to adopt an initial FIT.

During the panel hearings in this proceeding, the Commission inquired specifically to what extent remote control of projects would or would not trigger accounting issues. While the Commission recognized that the remote control requirements of Rule 14 may be outside the scope of the FIT proceeding it was thought that addressing them could be of assistance in the evaluation of FIT program implementation. Under EITF 01-8, the accounting assessment undertaken may include an evaluation of whether the arrangement conveys to the purchaser (lessee) the right to control the use of the underlying property, plant, or equipment. The supervisory control requirements of Tariff Rule 14, section F are to "ensure the safety of working personnel and prompt response to system abnormalities in the case of islanding of the generating facility." Control of the facility for these purposes does not meet the accounting standard of "control of the use of the underlying property, plant, or equipment"; therefore, the supervisory control requirement does not trigger lease accounting treatment.

Finally, it is the intent of the HECO Companies and the Consumer Advocate to initially prioritize those technologies for which there is already a high degree of demonstrated market desire and development experience in Hawaii, to be followed shortly thereafter in the first FIT Update by technologies that have been used elsewhere but have high potential in Hawaii. The proposed approach will provide additional time to gather data on the other technologies in order to establish reasonable pricing for technologies that are unproven or for which there has been no commercial experience in Hawaii.

Applying the criteria above, the HECO Companies and the Consumer Advocate propose that the initial FIT be focused on PV, CSP, in-line hydropower, and wind, with the following individual project sizes targeted to provide a greater likelihood of more straightforward interconnection, project implementation and use of standardized energy rates and power purchase contracting.

- Photovoltaic (PV) systems in size as follows:
  - Up to and including 500 kW on Oahu
  - Up to and including 250 kW on Maui and Hawaii
  - Up to and including 100 kW in size on Lanai and Molokai.
- Concentrated solar power (CSP) systems up to and including 500 kW in size on Oahu, Maui and Hawaii Island, and up to and including 100 kW on Lanai and Molokai.
- In-line hydropower systems up to and including 100 kW in size on Oahu, Maui, Lanai, Molokai and Hawaii Island
- Wind power systems up to and including 100 kW in size on Oahu, Maui, Lanai, Molokai, and Hawaii Island.

Phase 2 implementation, via the FIT Update process, will give priority consideration to developing tariffs for the following technologies:

- Wave energy generating systems
- Landfill gas generating systems
- Sewage-based digester gas generating systems

- Biomass, including biomass crops, agricultural and animal wastes, and municipal solid waste.[5]
- Biofueled Resources[6]

All eligible new renewable energy generation that comes online after adoption of the Proposed FIT would be eligible for FIT contracts. An existing generator that is repowered would be considered a "new" renewable energy generator and therefore would be eligible to receive the FIT. Similarly, capacity additions to existing renewable energy generation would also require the entire capacity to be placed under a FIT.

B. What is the maximum and minimum capacity of projects that should be eligible for the FiT?

For all of the reasons discussed above, the maximum project sizes and the total amounts of capacity by technology must be established on an island-by-island basis. In all cases, the reliable and economic supply of electricity to the entire island must be assigned the highest priority. Renewable generation projects connecting under the FIT are proposed to be limited to the following by technology and island location.

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[5] As discussed in the HECO Companies' and Consumer Advocate's Final Statement of Position, the HECO Companies and Consumer Advocate are not necessarily opposed to the inclusion of biomass technologies on an appropriate size in the initial FIT design. The HECO Companies and Consumer Advocate noted that to the extent that the parties could provide information to demonstrate the commercial availability of these projects and a market desire to develop these projects, the HECO Companies and Consumer Advocate would be willing to consider them for inclusion in the initial FIT. During the panel hearings, testimony was received from representatives of HREA recommending against including biomass technologies in the initial FIT. Accordingly, those technologies are not discussed here.

[6] As biofueled resources should be deferred until the first FIT Update, the eligibility of hybrid projects utilizing biofuels should also be deferred until the first FIT update. It is the opinion of the HECO Companies and Consumer Advocate that hybrid projects utilizing fossil fuels rather than renewable fuels should not be eligible for the Proposed FIT which targets the addition of new, renewable resources to the island grids.

Table 12 - Target Project Sizes by Island for the Four "Initial" Renewable Technologies

Island Location	Project Size Limit (kW)			
	Photovoltaic	Concentrated Solar Power	In-line Hydro	Wind Power
Oahu	500	500	100	100
Maui	250	500	100	100
Lanai	100	100	100	100
Molokai	100	100	100	100
Hawaii	250	500	100	100

For one or more specific islands, the cumulative maximum generating capacity for a given technology type may have already been reached. If this is the case, no additional capacity of that technology type may be connected under the FIT until system operators certify that the system can reliably accept the associated power output. In this instance, the incremental limit on renewable capacity for that technology is zero for those islands.

It must be noted here that the HECO Companies have already undertaken significant measures to improve their ability to effectively integrate existing and new variable generation on the island systems. These efforts include but are not limited to: 1) modifications to the HELCO and MECO AGC to reduce the responsiveness of the system to short-term fluctuations in power output of as-available generation to avoid overcompensating for these types of fluctuations; 2) modifications and tuning of the control systems for HELCO and MECO generating units to increase the accuracy of the control signals used for generation and to improve local droop response; 3) increasing the regulating reserve carried on the HELCO grid to provide greater upward ramping capability of online generators to respond to sustained drop offs of as-available generation; 4) HELCO transmission projects which have increased east-to-west transmission capacity that also allow for greater operating flexibility of dispatchable generation to reduce excess energy and curtailment of as-available generation; 5) HELCO has conducted a system

stability study to define the minimum amount of steam generation (generation with higher rotational inertia) that are required to run at all times to ensure the stability of the system during typical emergency events such as transmission system faults. This allows HELCO to better understand and quantify the amount of wind and PV energy (with very little to no rotational inertia) that the system can reliably accommodate; 6) appropriate changes to the commitment schedules and dispatch of MECO generation on Maui to reduce instances of excess energy and as-available curtailment; 7) increasing the regulating reserve carried on the Maui grid to provide greater upward ramping capability of online generators to respond to sustained drop offs of as-available generation; and 8) the construction of CIP CT-1 on the Oahu system which will provide greater ramping capability from firm, dispatchable generators which will increase the ability of the grid to respond to fluctuations in power output from as-available generation.

Moreover, going forward, all three of the HECO Companies are undertaking system studies to better understand what additional modifications are needed in operating practices and existing generation and T&D equipment, as well as the types and attributes needed from new demand response programs and generating units in order to increase the grid's ability to integrate as-available generation. For example, the Oahu "big wind" implementation studies have commenced with the signing of the HCEI Agreement and are scoped to provide technical and operational solutions to the integration of grandfathered (from the Competitive Bidding Framework) as-available renewable IPP proposals, up to 100 MW of renewable IPP projects from the RE RFP, and up to 400 MW of wind energy imported from Molokai and/or Lanai. As part of these implementation studies, similar to what was studied on the HELCO grid, HECO is commencing with a system stability study to define the minimum amount of high rotational inertia generation that is required to run on the system at all times to ensure the stability of the

system during typical emergency events such as transmission system faults. Additionally, HECO is currently testing their existing generators and reviewing what changes or modifications can be done to make the units more responsive to variable generation (i.e. higher ramp rates, variable ramp rates). These implementation studies are planned for completion at the end of the first quarter of 2010. MECO has initiated its own separate wind integration study that will analyze similar wind penetration percentages on the Maui grid as compared to the Oahu "big wind" implementation study. In addition, HELCO is initiating a study to research and develop wind forecasting capabilities that can predict periods of higher risk for large and rapid wind ramping events using available meteorological data available for the Hawaii Island system.

Although the HECO, HELCO, and MECO systems are making efforts to accommodate these variable generation resources while mitigating negative impacts on reliability and cost, ultimately each islands' power system will require generation which provides grid services such as frequency regulation, load following, inertial response, and other critical operating capabilities. Thus in the overall planning of the generation system, renewable energy resources able to provide these types of benefits are a necessary part of the overall goal for reaching the maximum amount of renewable energy on the power systems. Variable generation resources can comprise a greater part in the energy supply if variable generation is coupled with supplemental capabilities in order to provide characteristics similar to those provided now by conventional generation.

C. Should projects owned by utilities or their affiliates be eligible for the FiT and, if so, under what conditions?

As discussed during the panel hearings, this issue concerns participation in the FIT by utility affiliates rather than the utility. The HECO Companies have committed not to directly

participate in the initial FIT through any utility affiliates. However, given the HECO Companies' legal obligation to comply with the RPS, the HECO Companies reserve the right to develop or acquire utility-owned renewable resources outside of the FIT process to the extent that such development and/or acquisition is necessary to insure that RPS requirements, both existing and as modified in the future, may be met and the HECO Companies are able to satisfy their obligation under law. Such projects, if any, will be accomplished pursuant to the Commission's Rules of Practice and Procedure and General Orders governing utility ownership of resources and these regulatory processes will provide the necessary oversight and transparency to ensure that such procurement is undertaken consistent with the goals and policies of the Commission and State. In addition, utility-owned projects that provide opportunities to conduct research on mitigating impacts of variable generation may also be pursued, again, outside of the FIT.

IV. What decisions are necessary to ensure that FiT rates are just and reasonable, as required by Hawaii law?

A. Should the FiT facilitate the cost recovery of only the most cost-effective projects, a typical project, or most projects?

A goal of the FIT Proposal is to provide reasonable incentives to cost-effective renewable energy providers while balancing costs to ratepayers. In addition, technical issues must be addressed appropriately in the design of the FIT to ensure that system reliability is maintained. For example, and as discussed above, there are presently challenges on the HELCO and MECO systems to maintain stable system frequency due to the variability of certain renewable generating resources, the impact of a large amount of distributed generation, and displacement of generation performing critical grid services. For all HECO, HELCO, and MECO systems, the technical challenges associated with integration of variable generation increase as the grid penetration level of these resources increases.

Given the desire to ensure that the rates established in the FIT for the various renewable technologies and size of technologies are reasonable, the HECO Companies propose the first phase of the FIT should target those renewable energy technologies with a proven track record in Hawaii and with known cost data. This will help to ensure that the rates established for the FIT are reflective of the cost of generation plus a reasonable profit, and help to maintain system reliability given that the impacts of the operating characteristics of the technologies on the utility's system are somewhat known. The FIT should be regularly reviewed to encompass more technologies and adjust rates if necessary, and propose to do so within two years of the initial FIT, with ongoing reviews every three years thereafter.

The HECO Companies propose annual FIT targets on installed capacity by technology and size ranges. The annual targets should be based on various considerations including rate payer impacts and orderly introduction of renewable resources which will allow each island system operator to monitor the impact of additional renewable resources on operating the system to maintain system frequency and system reliability. As discussed briefly above, this is consistent with the directives contained in the Commission's Scoping Paper:

> *Overall caps on the amount of electricity purchased under PBFiTs are reasonable to consider, as the above-market price paid for electricity under a PBFiT places upward pressure on the retail price for electricity. *** A regulator may want to consider the total impact the Clean Energy Infrastructure Surcharge (CEIS) has on retail rates, not just the impact of the PBFiT purchases when setting a cap. Caps could be set so that when a utility meets its RPS goal, PBFiTs are not available to additional projects. Caps can also be placed on installed capacity, expected production, or rate impact (e.g., the difference between the purchased cost made under a PBFiT rate and an avoided-cost rate compared to total retail revenues).*

(Scoping Paper at 8)(Emphasis supplied)

Particularly relevant to the establishment of rates in this proceeding, the Scoping Paper suggests that the Commission "*make clear to all parties that without credible cost and operating*

data for a technology, the Commission cannot responsibly establish a PBFiT for that technology." (Scoping Paper at 9) Additionally, the Scoping Paper directs that:

> *In developing the cost support for a PBFiT, a regulator should examine typical costs and operating characteristics for that type of project, rather than the costs and characteristic of a single particular project using that technology. PBFiTs are meant to encourage reasonable projects (i.e., those that are at least as cost-effective as the typical project) rather than any project regardless of its costs. All cost and operating estimations should, however, be Hawaii-specific to the extent that Hawaii's unique geography affects cost.*

(Scoping Paper at 6)(Emphasis supplied)

The Scoping Paper also discusses the fact that the "*Commission must receive from the parties, especially developers, and assess for accuracy estimates of the typical cost of each technology if capital is to be efficiently attracted and extra costs are not to be borne by customers.*" (Scoping Paper at 5)(emphasis supplied) Accordingly, no specific tariff pricing is proposed at this time, as the HECO Companies and Consumer Advocate believe that data received in this proceeding, and through appropriate processes directed by the Commission to determine pricing, can be used to develop more accurate and geographically relevant tariff pricing. The HECO Companies and the Consumer Advocate, as stated in the HCEI Agreement, support FIT rates that are designed to cover the producer's costs of energy production plus reasonable profit.

Furthermore, the HECO Companies and the Consumer Advocate agree that tariff pricing should differentiate between technology type, project size, and location, and should be based on the costs of developing a "typical" project that is reasonably cost-effective. In this manner, the FIT payment rates will not encourage development of generation that is not cost-effective, consistent with the Commission's policy on distributed generation stated in Decision and Order No. 22248 in Docket No. 03-0371. Generally, project cost-based energy payment rates are

established based on a target internal rate of return ("IRR"), knowledge of project and generation cost information, and energy production. Ultimately, the Commission must make a determination as to an acceptable target IRR. The HECO Companies and the Consumer Advocate propose that FIT pricing be reviewed in the course of the FIT Update, and that an independent consultant be used to compile information and make recommendations on assumptions for the costs of generation and energy production levels. The Commission must also issue a determination concerning the ability to establish FIT energy payment rates above avoided cost.

Finally, while appropriate grid improvements will be required to accommodate a higher level of FIT resources, particularly on the more constrained island systems, assertions that the utilities should undertake any and all improvements required to accommodate FIT resources regardless of ratepayer impact should be carefully examined. The goal of increased renewables, including through a FIT program, must be appropriately balanced with the impact on ratepayers. The FIT Proposal facilitates this goal by integrating FIT resources, and the infrastructure required to support those resources, on an incremental basis which will allow the utilities to mitigate the impact on ratepayers while achieving the State's renewable resource targets. Moving forward in a measured and responsible way also preserves for the utilities and the Commission the flexibility to secure renewable resources through other means outside the FIT which may provide renewable energy at a lower cost, together with the grid benefits that will allow the utilities to accept greater levels of renewable resources, for the ratepayer.

B. What is a reasonable return on equity for a FiT project?

It is difficult for the HECO Companies or Consumer Advocate to opine on this question in a vacuum. Ultimately, project developers are in the best position to provide the Commission

with relevant information regarding a reasonable rate of return for a particular project or type of project. The parties to this proceeding should prevail upon the resources at their disposal to provide data regarding a reasonable return on equity for the Commission's consideration taking into account that the information should be appropriately supported with documentation to demonstrate to the Commission's satisfaction and parties' satisfaction that the information is accurate, reliable and relevant to the Hawaii market. To the extent that the parties desire different returns for different projects to reflect varying risk and cost of capital for different technologies, they should be directed to provide evidence in support of the differing returns that they seek. The HECO Companies and Consumer Advocate do not take a position at this time on whether the implied returns in the Proposed FIT should decline over time but reserve their respective rights to address this issue once relevant information on the implied returns has been provided.

C. What cost and performance information is needed to calculate FiT rates?

In considering the cost of a target generator for each technology, it is important to understand that there are a range of applicable costs for any particular technology. Idealized cost components vary depending on site-specifics, scale, resource quality, interconnection costs (a function of voltage, distance from the transmission or distribution facilities to which the project will interconnect, and other site-specific factors). In principle, a feed-in tariff rate can be set at a level that is aggressive (meant to capture most of the projects within this range) or conservative (meant to support only the most cost-effective installations). As discussed above, the HECO Companies and Consumer Advocate recommend setting the price based on middle-of-the-range cost estimates (neither aggressive nor conservative), intended to support an average cost or better

installation within the range of possibility. The relevant cost and performance information necessary to calculate FIT rates include but are not limited to:

- Capital costs: This component includes installed capital costs for both generation equipment and transmission and interconnection, including applicable sales taxes. It may also consider, as applicable, net decommissioning costs (if decommissioning costs are expected to exceed any residual value) or residual value.
- Project performance: including net capacity factors, estimated project life and projected generation degradation.
- Initial development costs: including engineering, permitting, environmental, management, legal, accounting, and contracting costs.
- Financing costs and cost of capital: including construction financing, up-front financing fees and transaction costs. The cost of permanent financing involves making assumptions about the assumed capital structure as well as the cost of debt (if used) and the target IRR. Lender requirements such as reserves and minimum debt coverage ratios should also be considered as applicable.
- Ongoing costs: these include estimates of the following costs both initially and as they change (escalate) over time: fixed and variable O&M expenses; fuel costs (if any); replacement parts; land lease costs; insurance; state and Federal income taxes (including the tax effects of depreciation), property taxes, excise and all other applicable taxes. Any grid support services or volumetric costs or charges typically required of and imposed on generators should also be accounted for. These types of services will vary widely depending on the project and location.

- Applicable Federal and state tax or other incentives.
- Discount rate: a discount rate must be selected for determining the equivalent NPV of the projected and levelized revenue streams. While the discount rate selected is typically related to the cost of capital, we recommend selecting a common discount rate to apply across all technologies for this purpose, as the required equity returns may vary by technology.

D. What are appropriate methodologies for calculating FiT rates?

Consistent with the PUC Scoping Paper, the HECO Companies and Consumer Advocate recommend using a model that uses a Discounted Cash Flow ("DCF") analysis methodology to assess cost of generation and the return on investment ("ROI") and Internal Rate of Return ("IRR") for the project over the life of the system. This model would produce results that calculate the Levelized Cost of Energy ("LCOE"). The LCOE is a measure of total costs of a system (over its expected lifetime) divided by the expected energy output (over its useful lifetime), with appropriate adjustments for the time value of money. The LCOE provides a useful mechanism to compare the cost of energy across different technologies. On a simplified basis, LCOE is the net present value of total life cycle costs divided by the quantity of the energy produced over the life of the project.

The DCF approach accounts for a comprehensive set of financial cash flow and tax inputs as well as performance characteristics in a financial model over a specified period of time. The analysis considers cash flows over the project's assumed economic life. If the contract duration is shorter than the assumed economic life, assumptions must also be made about the residual revenue stream for the remainder of the project economic life.

The inputs that go into the model include installed capital costs, general excise taxes, federal and state tax incentives, federal and state depreciation provisions, fixed and variable O&M expenses, fuel costs (if any), cost of financing, land costs or leases, insurance, transmission and interconnection costs, net capacity factors, estimated project life and projected generation degradation. We also should include ancillary service costs to provide power backup or other transmission or distribution services, if appropriate. These types of services will vary widely depending on the project and location. Using this methodology, the tariff energy rate can be set to target a specific IRR which the Commission deems to be reasonable.[7]

The HECO Companies and Consumer Advocate prefer relying on well-documented, capital cost and operating data for the various types of resources to be covered under a FIT, adjusted for Hawaii-specific conditions as appropriate. In this regard, the HECO Companies and Consumer Advocate agree with the PUC Scoping Paper statement that "a regulator should examine typical costs and operating characteristics for that type of project, rather than the costs and characteristics of a single particular project using that technology" and "all cost and operating estimations should, however, be Hawaii-specific to the extent that Hawaii's unique geography affects cost." Given the wide scope of the inputs needed to determine FIT rates, the initial FIT targets those resources for which reliable cost and production data can be obtained,

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[7] There are many simple spreadsheet models available that utilize this approach. For instance, KEMA has recently developed a model for Public Service New Mexico that is a simple spreadsheet analysis tool that assesses the LCOE, ROI and IRR for a number of different utility owned distributed generation business models. In addition, NREL has a spreadsheet-based model called the Financial Analysis Tool for Electric Energy Projects (FATE-2P) that can model a number of commercial project ownership options. There are also many guidebooks available that provide detailed information on LCOE methodology. The National Institute of Standards and Technology (NIST) recently published an update to the NIST Handbook 135, Life-Cycle Costing Manual for the United States Department of Energy Federal Energy Management Program (FEMP). It is recommended that this guidebook serve as a reference guide for development of the LCOE model to support FIT development in Hawaii. This guidebook is designed to provide energy price indices and discount factors for performing life-cycle cost analyses of energy and water conservation and renewable energy projects in federal facilities. The publication supports private-sector life-

especially considering Hawaii-specific factors. The following list provides a possible tariff setting process, recognizing that initially, a streamlined process will likely be used considering the parties' responses to the Commission's existing and future information requests:

- The utility hires an independent consultant (or alternatively, the utility pays for an independent consultant who can report to the Commission, the cost of which is recovered in rates).
- The consultant is tasked with compiling cost of generation data for each FIT project category. The cost of generation data should specifically account for Hawaii cost factors including cost of land, permitting, labor, materials, etc. The data should also take into account typical interconnection costs that may be required for each of the islands. The consultant should develop the cost of generation for what would be considered a "typical" project, meaning at the midpoint of the range of projects, keeping in mind the Commission's policy to encourage development of cost-effective distributed generation.
- With the cost of generation defined, the consultant should set forth the assumption for the amount of energy produced by the "typical" project, assuming Hawaii specific data such as average solar insolation by island, wind resources, etc. As much as possible, this data should be sourced from published sources such as NREL so that there is transparency in the assumptions used. The energy production assumptions should also be consistent with commonly accepted

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cycle analysis by updating the energy price indices and discount factors and illustrates the relevant equations for performing LCOE analysis.

industry practice, for example, the annual % degradation in energy output from PV panels.

- There will be more detail questions that might be considered. For example, a PV system in Kona (dry side of the Big Island) will produce more kWh than a PV system in Hilo (rainy side of the Big Island). If we assume the lower Hilo number in setting the tariff, then we will be providing a tariff rate that will provide the target IRR to the Hilo developer, and an even higher IRR for the Kona developer. This will naturally lead to more PV development in Kona, but at the same time it will support PV development in Hilo. The HECO Companies and Consumer Advocate recommend that the Commission target its assumptions towards support of the mid-range, consistent with the overall approach on the cost of generation discussed in detail above.
- The consultant will assume that project developers are able to use all published federal and state tax incentives, taking into account potential expiration dates.
- The Commission, in its D&O in this docket, should rule on what is an acceptable IRR. The consultant would use that IRR to come up with proposed new FIT rates.
- The utility would file these rates as part of the FIT process.

E. What interconnection costs should the FiT developer bear?

The Proposed FIT operates in conjunction with the HECO Companies' interconnection review processes and tariff, known as Tariff Rule 14.H (Rule 14.H"). All provisions for expedited interconnection review that are currently in Rule 14.H and Tariff Rule 18 Net Energy Metering will be retained under the FIT program. For example, Rule 18 establishes a streamlined

review for PV systems of 10 kW and smaller. Rule 14.H provides for expedited interconnection review of inverter-based (e.g., PV) systems up to 250 kW assuming there are no issues with distribution circuit penetration levels.

FIT generators are responsible for the costs of interconnection to the HECO Companies' grids, in conformance with the HECO Companies' Rule 14.H and other interconnection requirements and processes. Reasonable FIT generator interconnection costs, including costs of interconnection studies and modifications to the utility system, will be considered in the development of FIT payment rates for different generator categories. Consistent with the provisions of the HCEI Agreement, the HECO Companies may implement modifications on the utility system side of the point of interconnection to facilitate distributed energy resource utilization,the costs of which will be recovered through the Clean Energy Infrastructure Surcharge and later placed in rate base in the course of the next rate case proceeding.

In parallel with adopting and implementing a FIT, the HECO Companies will perform a review of Rule 14.H to address necessary modifications to accommodate FIT system interconnection. Modifications to Rule 14.H may be necessary to enhance system reliability, safety and visibility of distributed generation systems on the grid in light of state-specific technical issues and constraints, and to identify existing elements of Rule 14.H that can be more fully utilized. Overall system impacts of greater levels of customer-level distributed generation will be considered in the Clean Energy Scenario Planning process, and these impacts will be managed in part by the regular review of the annual installed capacity targets of the FIT.

The following is a preliminary identification of interconnection cost categories and how those costs should be appropriately allocated as between the utility and the developer.

1. Utility System Costs and Upgrades which would include but not necessarily be limited to costs associated with: (1) a new transmission line or infrastructure or upgrades to the existing infrastructure; (2) procurement and installation of equipment which provides supplemental balancing control to mitigate any adverse effects associated with variable generation; (3) relay upgrades, setting changes and protection reviews, and (4) other system operational tools and/or controls to further RE additions while maintaining reliability. With regard to this category of costs, to the extent that the equipment provides grid benefits, there may be a cost sharing between the developer and the utility. Generally, if a significant capital investment is required the utility should assume those costs and include that investment in rate base. To the extent that the expenditure is related to operations and maintenance (e.g., changing relay settings or engineering reviews) those costs should be assumed by the developer.

2. Project Specific Equipment which would include but not necessarily be limited to costs associated with: (1) line extensions, substation and transformation equipment and equipment installed at the customer site specifically for the project and (2) SCADA, control system and curtailment system which are specific to the project, allow for system interface and provide control and visibility of the plant to the system operator. The costs of this type of equipment should be the responsibility of the developer.

3. Interconnection Review Study costs. These costs should be the responsibility of the developer.

4. Risk Assessment Study costs. This study should be performed by and paid for by the developer.

5. System and feeder studies and technology verification studies performed by the utility. These study costs should be the responsibility of the utility.

F. How should FiT participants be compensated for curtailment?

The island nature of the HECO systems means that there is no export outlet for excess energy and accordingly, in cases where excess energy is present on the system, curtailment is required. The annual FIT quantity targets and requirements for curtailment of certain types of FIT resources must take this into account.

The inclusion of possible curtailment impacts on energy production in the FIT pricing warrants consideration. Estimating curtailments is a complex problem and is very difficult to do accurately. The estimate would require extensive modeling. It would involve several uncertainties, including estimations of the anticipated energy production, future system demand, future generation additions which might contribute to curtailments, and other system conditions. In addition, the consideration of possible curtailments in pricing would result in an unintended consequence of encouraging resources to come online with anticipated hours of non-production (which are compensated) because the output of the resource is not correlated with the system demand. The price paid would not reflect the true value of the energy to the system and consumers. Compensation for curtailment takes away the natural disincentive for adding excessive amounts of must-take energy to a system that will occur if the producer bears the costs of curtailment (through reduced sales). If curtailments are anticipated to be significant, then it is a clear indication that there is an excess amount of that type of energy on the power system or it is producing at the wrong time of day. The issues of excessive must-take energy extend beyond increased costs for the ratepayer; another result is a less responsive power system that is more at risk to failure following disturbance, as it is constrained towards minimum dispatch on the responsive generation which reduces the ability of the system to respond to loss of load events.

Perhaps oversimplifying the issue, as-available energy IPPs can be curtailed (or their output can be interrupted) due to: (1) system problems, (a) caused by specific as-available energy facilities - failing to comply with power quality (or performance) standards; or (b) caused by variable energy in general - excessive frequency fluctuations; (2) grid constraints, (a) e.g., the line through which the IPP is interconnected to the grid is de-energized for service; or (b) e.g., the line through which the IPP is interconnected to the grid incurs a forced outage; and (3) excess energy situations.

In the case of (3) and perhaps 1(b), curtailment generally is implemented, by contract, in reverse chronological order. In order to do this, there has to be a mechanism to institute and remove curtailment. In recent and new PPAs, that mechanism is a curtailment control interface (with older PPAs, it may be done through a telephone call.) The PPA provisions to do this are far more extensive than those in the proposed feed-in tariff contract, which generally relies on disconnection. Thus, as noted in the response to HRD/HECO-IR-4, there are small, essentially "non-curtailable" resources, such as residential PV systems, for which installation of curtailment equipment may not be technically or economically feasible.

If the FIT projects are small, and the amount is limited each year, an argument might be made that the projects generally should not be subject to curtailment during excess energy situations (unless absolutely necessary). The Commission would have to agree that such small generation projects (such as Feed-in Tariff projects, etc.) that are allowed to be installed without curtailment controls would not be curtailed before other as-available energy IPPs (including existing IPPs) because it is not practical. However, the impact on existing IPP's, and on projects currently under development in a difficult financing environment would have to be considered.

A third method to address the issue is to address the payment rate prospectively to take into account the level of curtailment experienced in the past, to the extent that the experienced curtailment exceeds some expected threshold. This "make whole" method would be difficult to administer in practice, and would not address the issues of encouraging the "wrong" projects discussed above. In addition, curtailed energy can only be estimated, it cannot be "measured". For example, the calculation of estimated curtailed energy for a wind farm is complicated, and requires extensive, time-sensitive data.

Therefore, it is recommended that any compensation to suppliers for potential curtailments be limited for these reasons. The need for curtailment for excess energy can be mitigated in a larger sense through targeting appropriate generation additions and limiting certain types of energy to avoid contributing must-take production during excess energy periods. In addition, if the FIT concept is properly limited to smaller projects that do not present integration issues, and targets technologies that tend not to produce energy during periods that presently require curtailments for excess energy, then the issue of curtailment during excess energy periods can be minimized.

In summary, the HECO Companies curtail generation at times to maintain system reliability and to manage difficult system conditions such as minimum load and high wind generation. Under the Proposed FIT, the HECO Companies should have the ability to impose operational standards and requirements, including generation curtailment, in order to maintain system reliability and meet obligations to existing power purchase contracts. For that reason, it is proposed that a lower FIT rate would be paid for generators that do not have the ability or the willingness to curtail output upon the utility's request. Generators without curtailment provisions would also be subject to lower annual capacity targets or in certain circumstances could be

precluded from eligibility for a FIT. As more experience is gained with FITs and the results become available from the technical studies outlined earlier, curtailment can be revisited in the initial FIT Update, as well as through subsequent reviews.

G. How should the FiT rates consider tax policies for renewables?

Investment and production tax credits should be considered as positive cash flows to the developer when conducting a discounted cash flow analysis to determine the FIT energy payment rate. As described in Section 3.5.2 of the KEMA Report, the HECO Companies and Consumer Advocate recommend using a model that uses a Discounted Cash Flow (DCF) analysis methodology to assess such nominal levelized feed-in tariff rates based on the cost of generation plus a target return on investment (ROI), or Internal Rate of Return (IRR), for the project over the life of the system. The DCF approach accounts for a comprehensive set of financial cash flow and tax inputs as well as performance characteristics in a financial model over a specified period of time. The inputs that go into the DCF analysis include in part state and Federal income taxes (including the tax effects of depreciation), property taxes, excise and all other applicable taxes, and applicable Federal and state tax or other incentives.

H. Should the FiT rate to which a project is otherwise entitled, be adjusted downward to reflect any rebates or other financial benefits received by the project?

As with the tax policies discussed immediately above, rebates or other financial benefits received by the project should be considered as positive cash flows to the developer when conducting a discounted cash flow analysis to determine the FIT energy payment rate. This assists in insuring that the developer does not receive a "windfall" return and that ratepayers are protected from paying an excessive rate for energy which comes in under the Proposed FIT.

I. Should the FiT automatically reflect changes in tax law and renewables programs or should such changes take place in periodic updates?

FIT rates will be differentiated by the availability of federal and state incentives that may or may not be in place for different renewable energy technologies.

J. How should the FiT account for project reliability benefits or lack thereof?

Depending upon the system to which it connects, such reliability benefits may be required in order to allow the generation on the system. Where a particular requirement is optional, a base tariff rate by technology will be paid to generation projects that have grid-friendly features such as being utility dispatchable or curtailable, or have low-voltage/low-frequency ride-through capabilities. The base FIT will be adjusted downwards for renewable energy systems that do not have these features, if allowable from a system integration perspective.[8] In addition, FITs will be differentiated by system size as warranted by technical requirements or where there are recognizable differences in typical project costs.

A hypothetical illustration for different sized PV systems is provided in the table below. As displayed, different technical attributes are to be either encouraged or required depending on the size of the PV system and the utility grid in question. The table shows that in the case of PV systems greater than or equal to 30 kW, this FIT requires expanded ride-through capability. Furthermore, a lower rate is paid to systems that are not curtailable, since they do not provide as much flexibility from a grid operability standpoint and may actually impose more costs on utility ratepayers, (e.g., by causing curtailment of other, less expensive energy sources). The hypothetical table also illustrates that for the more grid-friendly systems, greater annual

[8] The degree to which grid friendly features will be required in the FIT will depend on the specific island. For example, at HELCO, the high amount of variable generation already on the system will likely require that all inverter-based systems 30 kW and larger implement expanded under-frequency ride through. Thus, the HELCO FIT would assume this capability in its consideration of quantity targets.

quantities are targeted. Finally, energy payment rates may be higher for smaller systems due to higher project costs caused by having lower economies of scale, smaller tax incentives, and other factors. In the hypothetical example, a 24¢/kWh rate is paid to a smaller PV system with expanded ride-through capability, while the largest systems with the same technical attributes are paid 18¢/kWh. A FIT rate structure would be developed for each technology type, for each island, recognizing that technical attribute requirements and project costs differ from island to island.

Table 13 - FIT Program Design Matrix – Hypothetical Values

Island "X"					
	Technical Attributes		Annual Quantity Target		
	Curtailable	Expanded Voltage/Frequency Ride-Through	2010	2011	FIT Rate, ¢/kWh
100 kW <PV≤ 250 kW	Yes	Required	8 MW	8 MW	22
	...	Required	2 MW	2 MW	18
30 kW ≤ PV ≤ 100 kW	Yes	Required	5 MW	5 MW	23
	...	Required	2 MW	2 MW	19
PV < 30 kW	...	Yes	3 MW	3 MW	24
	...	...	1 MW	1 MW	20

The FITs will be revisited during the initial review that is proposed to be held two years after the initial adoption of the FIT, and every three years thereafter. Once the locational value maps are available from the Clean Energy Scenario Planning process, it may be desired to further differentiate FIT rates depending on whether a renewable energy generator is located in areas identified by the locational value maps.

K. Once a project receives a FiT rate, under what circumstances should its FiT rate change?

It is the position of the HECO Companies and Consumer Advocate that once an appropriately designed FIT rate is in place and the resource is operating and delivering power at that rate and pursuant to its FIT Agreement, that rate should not be subject to adjustment mid-course. This program structure provides revenue certainty to the generator which in turn influences the cost of capital as well as financing fees and other soft costs relating to financing and contracting. The only exception to this rule should be for the circumstance where the Commission has expressly reserved the right to terminate the contract in the event it is determined that the resource presents a significant risk to the reliability of the system.

L. Should the FiT contain baseline rates for new technologies?

As discussed above, the HECO Companies and the Consumer Advocate agree that initially, the FIT should target those technologies that are actively being developed in Hawaii, and on project types and sizes that are more straightforward to implement and lend themselves to use of standardized energy rates and power purchase contracting. Focusing on these resources will allow the Commission and stakeholders to more readily develop the initial FIT. As discussed herein, the proposed FIT initially targets renewable resources that: (1) do not require complex environmental and land use permitting which may impose significant uncertainties in project development timeframes and costs; (2) do not typically, by virtue of their operating characteristics and size relative to the utility system, require extensive and lengthy interconnection studies or the need for significant interconnection requirements; (3) have existing or proposed projects utilizing the same technology which have already addressed complex financial accounting issues relative to utility power purchase contracts; and (4) have already been, or are currently in the process of being, implemented in Hawaii in commercial (non-R&D) application. Applying these criteria, the HECO Companies and the Consumer Advocate propose

that the initial FIT be focused on PV, CSP, in-line hydropower, and wind, with individual project sizes targeted to provide a greater likelihood of more straightforward interconnection, project implementation and use of standardized energy rates and power purchase contracting.

Accordingly, the HECO Companies and Consumer Advocate do not support a generic baseline rate for new technologies but expressly reserve the right to evaluate the development of such a rate in the first and subsequent FIT Updates.

M. How should FiT rates account for inflation?

As discussed above, the DCF approach accounts for a comprehensive set of financial cash flow and tax inputs as well as performance characteristics in a financial model over a specified period of time. The analysis considers cash flows over the project's assumed economic life including estimates of ongoing costs (fixed and variable O&M expenses, fuel costs, replacement parts, etc.) both initially and as they change (escalate) over time.

N. How could FiT rates comply with the "avoided cost" provision on HRS § 269-27.2?

As discussed in more detail in the responses to the Commission's legal questions (which are being filed separately) posed during the panel hearings, on May 6, 2009, the Governor signed into law the provisions of HB1270 SD2 (designated as Act 50), which deletes avoided cost as an absolute cap on energy payment rates for renewables. The HRS §269-91 definition of "cost effective" is also amended to provide the Commission with flexibility in making this determination. The requirement that energy pricing must be just and reasonable remains under Hawaii law and it is submitted that the Proposed FIT accomplishes this goal as discussed in detail above.

V. What non-rate terms are necessary to make FiTs just and reasonable?

A. What should be the term of the FiT?

Through the Proposed FIT the HECO Companies and Consumer Advocate stated that the term of FIT contracts for new resources should be no longer than industry-standard assumptions on service life for a particular technology. Pursuant to agreement reached during the March 18-19, 2009 technical conference and settlement discussions, the Parties agreed that the standard term for a Schedule FIT Agreement should be 20 years for all eligible renewable resources provided that appropriate evidence is presented to support this length of term as consistent with the average expected life of each eligible resource.

B. Is there a need for a service contract along with the feed-in tariff, or should the tariff itself contain all the necessary legal rights and obligations?

It is the position of the HECO Companies and the Consumer Advocate that the appropriate vehicle to document the terms, conditions and obligations between the developer of the renewable resource and the utility is a standard offer contract. The HECO Companies and Consumer Advocate anticipate providing such a contract, together with their proposed tariff on September 22, 2009 (or any subsequent date established by the Commission) as directed in the Commission's May 21, 2009 letter in this docket.

Related to this issue, the Commission during the panel hearings in this proceeding inquired whether there were accounting implications (e.g., imputed debt) depending upon whether the FIT was technically a service contract or a tariff on file with the Commission. In response to that inquiry, the accounting implications of the FIT are determined by the substance of the obligations (i.e., the extent to which the utility is obligated) rather than the form of the arrangement (i.e., service contract vs. tariff). In summary, the accounting implications are dependent on the extent of the obligation which could include but may not be limited to the

circumstances under which the utility must make payments and conditions under which the obligation can be terminated.

C. What should be the rights and obligations associated with project output on expiration of the FiT term?

Following the initial term, projects should be allowed to extend their contracts on a year-by-year basis subject to a revised FIT energy rate appropriate for the specific project circumstance, considering among other factors the remaining useful life of the system (if any), and the FIT energy payment rates in effect at the time. The utility should not be obligated to purchase any energy if the FIT contract expires and is not renewed. (See KEMA Report, page 33, Sec 3.9)

D. What FiT attributes should be subject to periodic reexamination?

The FIT Proposal is intended as an interim starting point for what will eventually become a broad tariff offering to as many renewable technologies as is feasible. For the reasons described herein, the proposed FIT initially focuses on a subset of technologies and projects. The FIT will be regularly reviewed for the purpose of updating tariff pricing, applicable technologies, project sizes, and annual targets ("FIT Update"). A FIT Update will be conducted for all islands in the HECO Companies' service territory and is intended to be completed not later than two years after initial implementation of the FIT. For the first Update, the HECO Companies are open to consideration of the appropriate procedural vehicle to most efficiently accomplish the update, including but not limited to continuation of the current proceeding or the opening of a new docket as the Commission may determine. Thereafter, the FIT Update will be conducted every three years, incorporating inputs from the Clean Energy Scenario Planning ("CESP") process.

E. When should periodic reexaminations occur?

Please see the HECO Companies' and Consumer Advocate's response to Issue V.D. immediately above. Additionally, it is the HECO Companies' and Consumer Advocate's position that parties should not be able to petition for changes in the FIT between Commission scheduled updates as this could result in a never ending stream of ad hoc re-openers which would not be conducive to administrative efficiency.

F. What data should FiT projects have to submit?

Please see the HECO Companies' and Consumer Advocate's response to Issue IV.C. above.

G. Who should receive renewable energy credits and green attributes?

Under the Proposed FIT, the utility would be acquiring electrical energy plus associated environmental attributes. The utilities' purchase of the renewable energy is driven in large part by the utilities' obligations to acquire renewable energy, such as to meet statutory RPS requirements. Under the Proposed FIT pricing methodology, the FIT resource receives a bundled FIT energy payment that provides a targeted internal rate of return. The HECO Companies and Consumer Advocate propose that FIT energy payment rates be based on providing the FIT resource a reasonable profit on their investment. The methodology to establish the FIT payment rate will involve (1) a Commission determination on the targeted internal rate of return, and (2) establishing the cash flow elements, both positive and negative, for a project over the term of the FIT contract. The energy payment rate will then be adjusted accordingly until the target internal rate of return is reached. For a given internal rate of return, if a renewable energy credit ("REC") payment to the developer is included in the cash flow, the energy payment rate would be lower than if there was no separate REC payment line item in the cash flow. In other words, the utility,

if separately purchasing the REC from the developer, would correspondingly lower the FIT energy payment rate so that the bottom line internal rate of return to the developer will be the same. Any environmental credit associated with renewable energy purchased by the utility from the developer would be the property of the utility, provided, however, that such environmental credits should be to the benefit of the utility's ratepayers in that the value should be credited "above the line."

H. Should the tariff state the possibility that the commission can suspend the FiT based on reliability concerns?

To the extent that the Commission approved a FIT program but then discovered that there were serious reliability and security concerns associated with implementation of the program, the Commission should have the ability to honor its legal obligations and preserve grid reliability and security as might be necessary.

VI. Utility cost recovery: What principles should apply?

A. Are either additions to rate base or assured recovery for the utility appropriate?

Long term purchased power agreements such as have been proposed in the Proposed FIT will impact the credit quality of the utility entering into the contracts. Generally, there are three ways that any PPA may affect the utility's financial profile: 1) imputed debt treatment of the PPA, 2) a capital lease obligation reflected as debt on the utility's financial statements, and 3) consolidation of the seller (including the seller's debt) on the utility's financial statements. The HECO Companies would not enter into any agreement which would result in consolidation due to the significant adverse credit quality and financial reporting compliance issues associated with consolidation.

It is anticipated that the power purchase agreements under the FIT will increase imputed debt or possibly result in capital lease obligations (i.e., increase actual debt). Both imputed debt and capital lease obligations negatively impact the financial profile of the utility. The increase in imputed debt or capital lease obligations increases financial risk and consume utility borrowing capacity. Over the long term, this negatively impacts all stakeholders. Developers rely on having contracts with credit worthy off-takers in order to finance their projects. Customers rely on a credit worthy utility to maintain reliable service.

Parties to the HCEI Agreement process, other than the HECO Companies and Consumer Advocate, proposed that 10% of the utility's purchases under any FIT PPA should be included in the utility's rate base through 2015 as a means of restoring the financial profile of the utility and to enable it to undertake the FIT. The intent of the proposed rate base treatment was to address investor risks associated with imputed (or actual) debt. The incremental compensation is not readily quantified and correlated to the incremental risk. Solely for illustrative purposes however, a hypothetical 20 MW of FIT purchases at 20% capacity factor at 25¢/kwh would result in $8,760,000 in annual energy purchases. That would translate to $876,000 in rate base (10%). If the utility cost of capital grossed-up for revenue and income taxes were 14%, $876,000 in rate base would be roughly $120,000 in revenue requirements and roughly $70,000 in net income after taxes. Twenty years of 20 MW of as-available, all-in priced energy at 25% risk factor would result in imputed debt of approximately $1,200,000. (See discussion of computation of imputed debt in Docket No. 2008-0083, T-20, pp. 34-35 and HECO-2013.) In this hypothetical illustration, $70,000 (through January 2015) would be intended to compensate investors for having the additional risk of $1,200,000 in imputed debt (which will decline over a 20 year term).

The impact of financial degradation resulting from imputed debt of a FIT program with no return on purchased power expense is likewise not quantifiable. While the amount of estimated imputed debt associated with a FIT may appear relatively small relative to the utility's balance sheet in total, this imputed debt is in addition to numerous other sources of imputed debt resulting in part from the utility's other procurement programs. In addition to the existing imputed debt, the utility foresees rising imputed debt and potentially actual debt resulting from new purchased power, leasing arrangements, and other purchase obligations. Theoretically, credit quality degradation increases the cost of capital over the long-term.

Historically, the utility has addressed the imputed debt issue by decreasing its actual debt and increasing its proportion of equity. In the hypothetical illustration discussed above, the estimated revenue requirement impact of replacing proportionate amounts of actual debt with equity to maintain capitalization ratios for $1,200,000 of imputed debt would be approximately $80,000 (which in theory would decline over a 20 year term correlating to the amount of imputed debt). In the hypothetical example, the revenue requirement of rate base treatment is $120,000 for the period through 2015 only, while the cost of rebalancing is $80,000 over the 20 year term. The utility does note, however, that it is limited in its ability to restore financial ratios to maintain credit quality by increasing the proportion of equity in its capital structure to offset the imputed debt. The HECO Companies view the proposed rate base treatment as a means of addressing the growing risks of long-term purchase obligations.

Alternatively, in lieu of the utility earning any return on purchased power, a FIT agreement which limits the utility's liability under the FIT agreement to the amount that the utility recovers in its rates could be considered. Under such a provision, the HECO Companies' payments to the customer-generator would be limited to the amounts recoverable in the

purchased power (or other direct cost recovery) clause. Since under the proposed feed-in tariff, the HECO Companies would be offering standard offer contracts at prices established through regulation, the proposed liability limitation for renewable electricity purchases provides a reasonable alternative to legislatively established cost recovery mechanisms and is appropriate in the circumstances.

B. How should FiT costs be allocated to the customers of the three HECO companies?

Power purchase costs under the FIT would be allocated utility-by-utility, not state-wide. Program costs are anticipated to be allocated along defined ratios with 80% of the costs allocated to HECO, 10% allocated to MECO and 10% allocated to HELCO. The allocation of costs may be revisited to the extent a cross-island transmission cable is approved and constructed.

VII. What are the appropriate processes for accepting and interconnecting FiT projects?

A. What queuing and interconnection procedures should FIT projects use?

Applications for FITs will be taken on a first-come, first-served basis. With the extent that enough applications for a FIT are filed to meet or exceed the island-specific annual capacity limit, and the cumulative capacity limit, the HECO Companies propose to submit a letter to provide appropriate notice to the Commission. Applications for a FIT will continue to be accepted and placed on a waiting list, also in order of when the application is filed. Generators on the waiting list will proceed should generators who have entered into a contract under a FIT withdraw or fail to meet deadlines for coming into operation, as is discussed later in this proposal. More applications for the FIT may also be undertaken in the future during the policy review of the FIT and from reviews of the annual and cumulative capacity targets.

B. What, if any, modifications should be made to Rule 14 provisions for penetration of generating sources and remote control?

As discussed above, the HECO Companies anticipate performing a review of Rule 14.H in parallel with adoption and implementation of the Proposed FIT to address necessary modifications to accommodate distributed generation which is encouraged by FIT. Modifications to Rule 14.H will be necessary to enhance system reliability, safety and visibility of distributed generation systems on the grid in light of the export of power from FIT systems to the grid, and grid-specific technical issues and constraints. In addition, the HECO Companies will more fully utilize existing elements of Rule 14.H and IEEE 1547 to integrate higher amounts of distributed renewables. For example, to accommodate additional PV, HELCO is reviewing expanded under-frequency ride through requirements for distributed generators greater than or equal to 30 kW in size as currently allowed by Rule 14.H and IEEE 1547.

As discussed in detail herein, the design of the FIT and interconnection requirements must take into account the unique nature of the isolated island grids in Hawaii and the technical challenges with integrating large amounts of distributed FIT renewable resources on island power systems. Specifically, integration of these resources must consider (1) variability of power output; (2) frequency regulation; (3) ride through capability; (4) dispatchability; (5) curtailability; (6) peak load contribution; (7) non-peak load contribution; and (8) local impacts on feeders.

VIII. If the Commission does approve FiTs, what actions can it take to keep total costs reasonable?

A. Should the commission limit the FiT scope (i.e., eligible technologies, project size) initially? If so, at what rate should the commission then expand the scope?

Recognizing the unique technical characteristics of Hawaii's isolated island grid systems, the current high cost of electricity, and the desire to establish a FIT system that is efficient, the Proposed FIT is designed to achieve the following policy objectives:

1. Facilitate an electric utility's acquisition of renewable energy in a systematic manner;
2. Offer a means by which to acquire new renewable energy resources that are reasonable in cost; and
3. Do not negatively impact the reliability or unduly encumber the operation or maintenance of Hawaii's unique island electric systems.

Accordingly, as discussed in detail above, the Proposed FIT initially focuses on specific technologies and project sizes and is designed to complement other mechanisms to acquire renewable energy, out of recognition that these mechanisms may be more appropriate in targeting development of certain resources. For example, larger dispatchable resources or technologies requiring large economies of scale (e.g., waste-to-energy) are more effectively encouraged and developed using the Commission's Framework for Competitive Bidding. Therefore the proposed FIT targets smaller scale resources.

The Proposed FIT is also intended to support predictability and streamlining in pricing, contracting, and project development, to the benefit of both renewable energy producers and ratepayers. Therefore the Proposed FIT initially targets those projects for which Hawaii-specific costs and technical requirements are better understood and can be established in the near term. Other resources for which a FIT is not immediately available can be contracted on a one-off basis with the utility under existing processes.

Perhaps most critically, unlike much larger interconnected and integrated systems in the mainland United States, Canada and Europe, the Hawaii island systems do not enjoy the flexibility that comes with being able to import power from a neighboring utility, state, province or country when suffering a shortage or export power when there is an excess. The Hawaii

systems are literally and figuratively "islanded." The practical result of the Hawaii electric utility systems not being interconnected and serving much smaller loads is that the Hawaii island grids are not very forgiving of unexpected or unplanned system resource additions especially if the resource energy is to be designated as must-take. The need to maintain reliability and power quality based solely upon the resources and load on each island means that the operating characteristics of a particular resource, the size of that resource, the location of the resource (both geographically and in relation to the existing transmission and distribution infrastructure) and when the resource will come on-line are all critical to the utility's ability to appropriately integrate that resource and operate the system. It is against this factual backdrop, that the Hawaii island systems do not have the options that virtually every other major electrical grid in the world has, that any procurement mechanism such as a FIT must be designed.

In the case of renewable resources, there is an additional factor which must be considered in designing a procurement program – the fact that the HECO Companies, in particular the HELCO and MECO systems, already have some of the highest penetrations of variable renewable resources in the world. Unlike other national or international grid systems which do not have to or are just beginning to address the integration issues which arise as more variable resources are accepted on their systems, the HECO Companies are recognized as a global leader in these efforts due to the high levels of existing variable resources and the commitments to take on additional variable resources in the near future. As levels of variable renewable resources rise, it becomes more and more difficult to integrate these types of resources and efficiently operate an island grid. Moreover, it must be recognized that operational changes which may be utilized by the operators of larger interconnected grids to manage high penetrations of variable generation, such as leveraging wind forecasting across geographic areas to reduce forecasting

error impacts, and increasing the size of balancing areas, are not applicable to the island systems. Further, there are renewable energy options for these islands with superior grid characteristics similar to conventional generators, such as biomass and geothermal energy. Although these technologies offer significant benefits over as-available resources such as firm, dispatchable energy and the capability of perform critical grid support functions; they may not have the extreme flexibility which would be required to further the variable generation component on the island systems above the existing high penetration levels. The costs and benefits of renewable energy from all potential sources must be considered in the planning and considered in the allocation of energy to the FiT sources.

Notably, the Commission's Scoping Paper in this proceeding provides explicit guidance on how best to integrate various renewable technologies into a FIT program. Specifically, the Scoping Paper recognizes that "the goal of the PBFiT is to encourage the development of certain resources." (Scoping Paper at 12)(emphasis supplied). The Scoping Paper expressly recommends:

> *With probably over a dozen different technologies, some of which require further segmentation by size or location, the number of PBFiTs needed is large. The Commission may wish to focus on PBFiTs that merit priority attention based upon the projects under consideration, or that might be more likely candidates for consideration based upon the existence of a reasonable PBFiT.*

(Id.)

Therefore, for the initial FIT, the Commission should target those technologies that are actively being developed in Hawaii, and on project types and sizes that are more straightforward to implement and lend themselves to use of standardized energy rates and power purchase contracting. Focusing on these resources will allow the Commission and stakeholders to more readily develop the initial FIT recognizing that the FIT should be regularly reviewed to evaluate

additional technologies and project sizes. This evaluation process should occur within two years of the initial FIT, with ongoing reviews as part of the Clean Energy Scenario Planning (CESP) process.

B. Should the commission establish purchase caps as a means of keeping total costs reasonable? If so, what purchase caps should the FiT contain?

The HECO Companies and Consumer Advocate are in agreement with the Commission that it is reasonable to place appropriate limits on the amount of electricity to be purchased under a FIT both as a means to ensure that total program costs to the ratepayer are reasonable and to insure that system security and reliability is maintained. As the Commission stated in its Scoping Paper:

> *Overall caps on the amount of electricity purchased under PEFiTs are reasonable to consider, as the above-market price paid for electricity under a PEFiT places upward pressure on the retail price for electricity. *** A regulator may want to consider the total impact the Clean Energy Infrastructure Surcharge (CEIS) has on retail rates, not just the impact of the PBFiT purchases when setting a cap. Caps could be set so that when a utility meets its RPS goal, PEFiTs are not available to additional projects. Caps can also be placed on installed capacity, expected production, or rate impact (e.g., the difference between the purchased cost made under a PEFiT rate and an avoided-cost rate compared to total retail revenues).*

(Scoping Paper at 8)

The Scoping Paper states that caps could be placed on installed capacity, expected production or rate impacts. The HECO Companies and Consumer Advocate chose installed capacity, as it is difficult to estimate precisely the estimated production that may come from FIT generators, and a quantity cap can be designed that takes rate impacts into account. Annual capacity targets will be based on technical estimates of what each island can accommodate, and will take into account generator characteristics that aid in maintaining grid reliability, such as ability to be curtailed or possessing low-voltage/low-frequency ride-through capabilities. Some

of the HECO Companies already have significant levels of eligible renewable energy and distributed generation on their systems. HELCO, for instance, receives over 30% of its net electricity energy from renewable energy generation. The large penetration of variable, non-dispatchable generation has resulted in fewer generating units on-line providing grid stabilization and frequency regulation, reduced island system stability, and greater frequency swings due to the variable generating output from wind and PV technologies. Curtailment of renewable generation at HELCO is already occurring at times to maintain system stability.

It is anticipated that interim annual installed capacity targets for each technology for each island can be provided after the settlement discussions in August and with the proposed tariff and standard offer contract to be submitted to the Commission on September 22, 2009 (or subsequent date established by the Commission). Annual capacity limits will be regularly updated in the course of the FIT Update that will take into account the following technical and non-technical considerations:

- ***Renewable portfolio standards requirements ("RPS").*** The Hawaii RPS requires the HECO Companies to obtain 20 percent of net electricity sales from renewable electrical energy by 2020. The HCEI Agreement proposes to increase the RPS renewable generation requirement to 40 percent by 2030. The FIT will serve to incent the installation of renewable generation at an increased rate.
- ***The goals of the Hawaii Clean Energy Initiative ("HCEI").*** The overarching objective of the HCEI is the "economic and culturally sensitive use of natural resources to achieve energy supply security and price stability for the people of Hawaii, as well as significant environmental and economic opportunities and benefits." A FIT will act to allow for the economic development of the State's

abundant renewable resources, which will provide both environmental and economic benefits by reducing reliance on expensive, imported fossil fuels.

- ***Technical attributes of the resources***. Higher annual FIT quantity targets can be set for FIT systems that support reliable grid management such as low-frequency ride through, the ability to provide reactive power and the ability to be curtailed or dispatched by utility system operators.
- ***Characteristics of the utility systems being interconnected.*** Certain HECO Companies are able to incorporate more FIT generation than others, due to variations in the size and robustness of the transmission and distribution grid and the differences in customer load among the islands. The annual quantity targets will be designed to account for these differences. In addition, the three HECO Companies have different renewable energy resources which can be considered in the overall planning and allocation of capacity to FiT sources.
- ***Cumulative amounts of installed variable resources***. Setting of the annual FIT quantity targets for each island must consider the cumulative amount of variable generation that is installed island-wide, including via resource acquisition mechanisms besides the FIT. Certain HECO Companies already have a significant level of RPS-eligible and distributed generation capacity and may have correspondingly less ability to incorporate higher levels of FIT-eligible resources. HELCO, for instance, already receives over 30 percent of its energy from RPS-eligible resources, with an increasing level from distributed generation resources. The large penetration of variable, non-dispatchable generation has resulted in fewer generating units on-line providing grid stabilization and frequency

regulation, reduced island system stability, and greater frequency swings due to the variable generating output from wind and PV technologies. Curtailment of renewable generation at HELCO is already occurring at times to maintain system stability.

There is a need to establish high level cumulative system targets for variable generation by island to avoid system stability issues and reduced system reliability. The cumulative system capacity targets should include all variable generation including independent power producers, net energy metered systems, and FIT systems that will contribute to island system stability issues. The high level cumulative target settings by island will be incorporated and regularly updated in the CESP process. The annual FIT quantity targets will take this into account when the data become available. In the interim, to manage this issue for those island systems that are already highly sensitive to adding more variable resources such as at HELCO, the initial proposed FIT will target resources with grid-friendly features.

- ***Impacts on curtailment of as-available energy from existing resources.*** Some of the HECO Companies already curtail generation, including renewable energy generation, in order to maintain system reliability, such as during times of high wind generation at minimum system load periods. Adding additional variable generation via the FIT that is not controllable may increase the amount and frequency of existing renewable generation that is curtailed. The annual FIT quantity targets and requirements for curtailment of certain types of FIT resources must take this into account.

- ***Projected energy production levels***. The HECO Companies and the Consumer Advocate have agreed to initially limit the FIT to a subset of RPS-eligible technologies in part because these technologies are already, or are in the process of being, implemented in Hawaii in commercial applications. Therefore, projected energy production levels from these FIT-eligible resources can be made with greater confidence that the energy will in fact be produced to meet ratepayer needs. There is greater uncertainty as to whether the energy from technologies that have not been deployed commercially in Hawaii, or are at a more R&D stage than other technologies will in fact materialize. Because of the proposed quantity and size targets and queuing process for interconnection, it is necessary to ensure that the projects are likely to materialize. Waiting until the first FIT Update to add the Phase 2 technologies listed in Section III.A. above will allow time for more information on cost and projected energy production levels to be gathered and increase the likelihood of successfully implementing the FIT as well as the generation technologies coming on-line.
- ***Ratepayer impacts.*** Under a FIT, the HECO Companies will purchase generation from eligible FIT resources. Annual FIT quantity targets should consider the total amount of FIT power purchase costs from year to year and the resultant impacts on ratepayers. Consideration of ratepayer impacts should also take into account ratepayer impacts from other resource acquisition mechanisms.
- ***Impacts on utility credit ratings.*** Power purchases may affect the HECO Companies' credit rating, as the credit rating agencies view these purchases as potential debt for the HECO Companies. Should the HECO Companies' credit

ratings be lowered for any reason, financing costs for the HECO Companies may increase. Therefore, the ability of the HECO Companies to purchase generation from third parties without affecting the HECO Companies' credit rating will affect the determination of annual capacity targets for the FIT. Imposing an annual FIT quantity target, plus the HCEI agreement to include 10% of the utility's purchases under the feed-in tariff in rate base through January 2015, will help mitigate this issue.

- ***Administrative resource requirements.*** Deploying the FIT will require the HECO Companies to process FIT applications, conduct Rule 14.H interconnection reviews, and otherwise administer the tariff. The annual FIT quantity target will aid in managing these administrative resource requirements.
- ***Other policy goals including the desire to provide fair opportunity to multiple developers or to encourage development of certain market segments, for example, residential and small commercial PV.*** How the FIT is designed will determine whether or not residential and small commercial PV systems can get a reasonable portion of the market share. Specific elements of the FIT should facilitate the development of these markets. These elements include quantity targets, interconnection requirements, and eligibility among others.

As the impacts of the interim annual quantity targets are assessed, the interim annual quantity targets will be reviewed to determine whether these targets need to be adjusted, with the first review to occur two years from when the FIT is first adopted. Thereafter, the annual capacity targets will be reviewed and adjusted if necessary every three years with information from the Clean Energy Scenario Planning process.

Moreover, the setting of appropriate annual limits upon FIT procurement will assist the Commission in managing other costs associated with a FIT program such as costs associated with a reduction in procurement of fossil fuels, costs associated with moving away from economic dispatch (higher average heat rate associated with loss of fuel efficiency), costs associated with minimum dispatch commitment under some contracts, and costs associated with loss of volumetric discounts.

The cost associated with a FIT program can be broken down into the following categories:

1. Reductions in procurement from fossil and other dispatchable generation. The HECO Companies, consistent with provisions of their PPAs, take as much generation from as-available resources within limitations of operational technical and safety issues. This includes the practice of purchasing as-available renewable generation from generators (including those to be acquired through a FIT) and displacing lower-cost energy from dispatchable fossil or renewable generation. If greater levels of lower-cost energy from dispatchable fossil or renewable generation are displaced as a result of a FIT program, then average energy costs will rise and the increase in average energy cost may become a significant cost associated with a FIT program.
2. Additional quick-start and fast-ramping generation (or equivalent load control) that may need to be added in order to reliably integrate variable, non-firm FIT program generation. To the extent that a FIT increases the amount of variable, non-firm generation, total generation variability not within the control of the utility will increase. In order to accommodate higher levels of uncontrollable

generation in its system and precisely match total generation to load, the HECO Companies may determine that they may need to increase their inventory of quick-starting and fast-ramping generation or load control to offset sudden changes in output from FIT generation. Operational and system planning may determine that the HECO Companies may need to add new dispatchable generation or demand response capability in order to provide needed quick-starting and fast-ramping capability. Therefore, the cost of new generation and/or incentives and equipment for demand response may be a significant cost associated with a FIT program.

3. Possible modifications to existing generators to increase their operating flexibility to assist with the integration of variable, non-firm FIT program generation. In addition to new generation and demand response, modifications to existing generators (utility and IPP) may be needed in order to increase their operating flexibility and assist with the integration of variable, non-firm generation acquired through a FIT program. Such modification may include mechanical and control modifications to allow these units to start-up more quickly, modifications to increase their ramping capability, and considerable modifications to baseload generators to make them cycling capable. These costs include capital investment to modify the design of these units as well as additional O&M associated with an increase in wear and tear of mechanical components resulting from sudden changes in mechanical and thermal stresses.

4. Increases in system average heat rate (fuel efficiency). The HECO Companies dispatch generation through their Automatic Generation Control systems (AGC) (where available) in a way that minimizes production costs among utility and IPP

units in which it has dispatch control. However, not all generators connected to the grid are dispatchable. For example, some IPP contracts are of fixed dispatch or scheduled energy which prescribes in advance a set or scheduled level of power output for the generator and output of these generators is not controllable by the utility for economic reasons. As more non-dispatchable generators are added to the system, the kilowatthours of energy available to serve by the remaining dispatchable generators decreases. The AGC will continue to allocate remaining demand to the dispatchable generators to minimize costs, but because these generators are serving a smaller portion of the total energy base, generating units will operate for more hours at less efficient points and overall heat rate of the system will increase (become less efficient) and ability to optimize (minimize) costs among dispatchable resources (with consideration for different fuel costs) is reduced.

In addition, the addition of more variable, non-firm generation acquired through a FIT program would add to the variability of the overall system. Increased variability will increase the responsive reserves needed for system balancing and control. Increasing the minimum regulating reserve requirement also reduces overall system efficiency, and may constrain the economic dispatch in order to provide fast response (in up and down reserve directions). Although economic dispatch will continue to be performed, increasing reserves results in reduced efficiency and more running hours on dispatchable generators.

5. Reduction in purchases below minimum purchase provisions for some IPP generation. The HECO Companies have experience with a PPA in which there is

an annual minimum energy purchase provision. This provision obligates the utility to purchase energy to this minimum annual purchase level even if the generator is dispatched through its contract year for less kilowatthours. To date, the utility has been able to economically dispatch this IPP at levels at or above this minimum purchase level, thus avoiding paying for energy that it did not use. However, if a FIT program results in a reduction in the dispatch of this IPP to an annual energy level below the minimum purchase, customers will be required to pay for kilowatthours that it has not used, resulting in an additional cost associated with the FIT program.

6. Loss of volumetric discounts in fuel purchases. The HECO Companies have long-term fuel purchase contracts with fuel suppliers for Low Sulfur Fuel Oil (LSFO), Medium Sulfur Fuel Oil (MSFO), and diesel fuel oil (diesel) used in utility generators. These fuel oil contracts have provisions in which the unit price for some fuels vary depending upon the volume of fuel purchased. Thus, reductions in the volume of fossil fuel purchase under these existing contracts resulting from the addition of non-utility or non-fossil generation may result in a higher unit price for fossil fuel purchases under these current contracts.

Finally, in evaluating how best to keep the total costs associated with a FIT program reasonable, the Commission should consider the balance between the loss of load to the utility and how ultimately that may impact the utilities' ability to accept more renewable resources on its system.

Price elasticity, or the way in which customers electricity usage responds to a price change varies across utility systems and customer classes. In general there is a relationship

between electricity prices and demand such that when the kilowatt-hour price of electricity rises, customers reduce their electricity consumption. In addition, price elasticity is impacted by the level of prices changes (i.e., small changes in prices may result in little or no price elasticity but larger changes in prices may result in greater price elasticity). Price elasticity can be also affected by the rate of change in prices. In other words, if prices rise or decrease rapidly, customers' response to the absolute price change may differ from instances in which the same absolute price change occurs more gradually over a longer period of time. Therefore, if a FIT results in an increase in electric rates paid for by customers, it is expected that this will result in a decrease in electricity consumption by utility customers beyond the actual utility energy displaced by FiT generators which would negatively impact the overall load to be served.

C. Should the FiT rates decline over time?

The HECO Companies and the Consumer Advocate support FIT rates that are designed to cover the producer's costs of energy production plus reasonable profit. Tariff pricing should differentiate between technology type, project size, and location, and should be based on the costs of developing a "typical" project that is reasonably cost-effective. In this manner, the FIT payment rates will not encourage development of generation that is not cost-effective. FIT rates will be revisited during the initial review that is proposed to be held two years after the initial adoption of the FIT, and every three years thereafter. As a part of this ongoing update process, the Commission may determine that it is appropriate based upon factors similar to those to be considered in setting annual capacity targets, to reduce the FIT rates developed for the initial FIT. Once the locational value maps are available from the Clean Energy Scenario Planning process, it may be desired to further differentiate FIT rates depending on whether a renewable energy generator is located in areas identified by the locational value maps. The HECO Companies and

Consumer Advocate offer that once a contract is executed at the then applicable rate, that nominal levelized rate should not be altered for the duration of the contract, providing revenue certainty to the generator.

D. Should the tariff state the possibility that the commission can suspend the FiT based on cost concerns?

To the extent that the Commission approved a FIT program but then discovered that there were serious negative ratepayer impacts associated with implementation of the program, the Commission should have the flexibility to suspend the program or otherwise defer the applications of new resources so that the Commission may appropriately address the cost and ratepayer concerns that may arise.

CONCLUSION

The Proposed FIT is intended as an interim starting point for what will eventually become a simple, streamlined and broad tariff offering to as many renewable technologies as is feasible while also allowing for the effective, reliable and cost effective delivery of electrical service. For the reasons described herein, the Proposed FIT initially focuses on a subset of technologies and projects. The FIT will be regularly reviewed for the purpose of updating tariff pricing, applicable technologies, project sizes, and annual targets through the FIT Update. A FIT Update will be conducted for all islands in the HECO Companies' service territory not later than two years after initial implementation of the FIT. Thereafter, the FIT Update will be conducted every three years, incorporating inputs from the CESP process.

As discussed above, the issues to be addressed and decisions to be rendered in this docket are presented not in a vacuum, but in the context of the State's energy infrastructure and policy both as they exist today and as they are envisioned to change in the future. The Proposed FIT

appropriately balances incentives to build with the need to maintain system security, power quality and avoid adverse ratepayer impacts. The Proposed FIT complements a host of other renewable resource procurement programs in existence and to be developed by the HECO Companies to facilitate movement toward a renewable energy future for the State. The HECO Companies and Consumer Advocate respectfully submit that the Proposed FIT is the only proposal which is supported by the record, which appropriately considers all of the variables for determination by the Commission in context, and which provides a going forward solution which is both innovative and responsible.

Dated: Honolulu, Hawaii, June 12, 2009.

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CERTIFICATE OF SERVICE

The foregoing Opening Brief of the HECO Companies and Consumer Advocate was served on the date of filing by mail, postage prepaid, and properly addressed or electronically transmitted to each such Party.

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